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New Cornish Engine.

The Philadelphia *Ledger* describes a new "Cornish Engine," built in that city for the Camden Water Works. This engine has a cylinder of 40 inches and a pump of 22 inches, the stroke being 8 feet. The boilers consist of a horizontal boiler, extending over the furnace in the usual manner; the bridge wall at the back of the grate bars is built up so as to throw the main body of the heat against the boiler, but allowing a portion to be carried over this wall to act upon a second lower boiler or heater suspended behind it, and connected by pipes with the main boiler. The water is introduced into the lower boiler, and consequently does not enter the upper one until heated to about 212°. This preserves the upper boiler from any sediment, all extraneous matter being deposited in the lower boiler, from which it can be easily removed. The heat which is usually carried off by the draft and wasted, is made to act upon the lower boiler, so that the heating of both requires no more fuel than for one of ordinary construction.

Improved Steam Valve.

The accompanying engraving is illustrative of an improvement in valves, which forms the subject of a patent granted to Mr. Jas. McNab and Mr. Adam Carr, of New York City, Jan. 15, 1856. Fig. 1 is a perspective, and figs. 2 and 3 sectional views.

In external shape this valve is the same as those in common use. The improvement consists in a new arrangement of the valve spindle, which permits on easy re-grinding of the valve when it becomes leaky. Ordinary globe valves are very extensively used, but they are subject to two serious objections; first, it is seldom that they are perfectly tight when new, and second, it is extremely difficult to grind them out, after they have become once leaky, and the leak all the time increases. Indeed, when a valve gets out of order, it is frequently considered cheaper and better to remove the same, and substitute another, than to attempt any repair.

Referring to the engravings, A A is an outer shell slipped over the valve spindle, B, and attached to the latter by means of the screw threads at C C; the small screw, D, is inserted for additional security.

To re-grind this valve it is only necessary to unscrew the top piece, E, run the spindle, B, down, so as to clear it from E, remove screw D, separate the spindle from shell C, and then return the spindle, B, to its place, and restore the piece, E. Thus changed, the spindle will be loose within the shell, A, and may be revolved *ad libitum*, and the valve, A, ground out in its seat with emery.

A perfectly tight joint may thus be obtained in a very short space of time, and the parts be again returned to their original position, ready for use. The re-grinding, it will be observed, is done without removing the valve box from the pipe, so that there is no pipe soldering, brazing, or jointing to be attended to. The improvement, it is evident, effects a great saving in time, labor, and trouble.

IMPROVEMENT IN STEAM VALVES.

Fig. 1

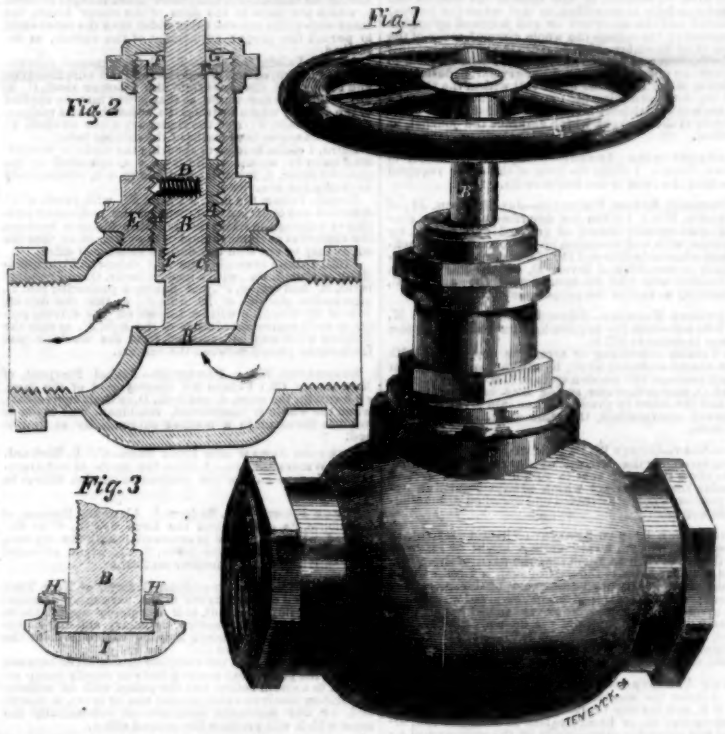


Fig. 2

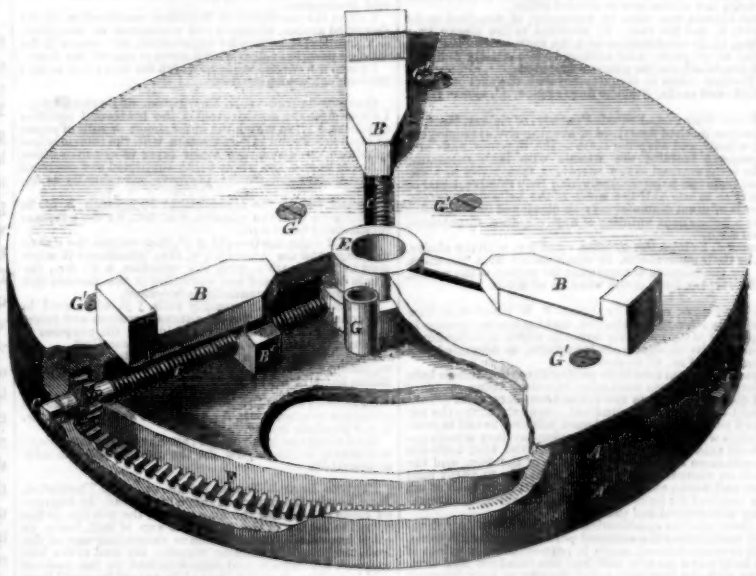
Fig. 3

This improvement may be used in connection with fixed or loose valves with equal facility. In fig. 3, B is the spindle, I loose valve, H screw nut on valve. Between the nut, H, and the top of the shoulder, on spindle B, a washer is placed, which renders valve I loose upon the spindle; remove the washer, and nut H may be screwed down tight upon the shoulder, and thus bind and hold I, like the fixed valve, so that it may be ground, as described. B′, is firmly attached to the spindle, B, but between the valve and the shoulder just above, there is sufficient space to allow the attachment of a loose valve, if preferable. Both kinds of valves are manufactured by the patentees, and both may be ground out with the same convenience.

The stuffing box in the above valve deserves notice. It is improved by the insertion of a collar, F, at the bottom of the box, and thus a perfect chamber, G, is formed, for the reception of the packing above the top of the interior screw. In the old valves the packing is liable to fall down into the screw thread, and impede the action of the valve. The present improvement effectually obviates that difficulty.

These valves, we are told, are rapidly coming into use. Being much superior to the common article, and costing about the same price, they will, eventually, drive out the old-fashioned kind, to a great extent. The inventors are now manufacturing a variety of sizes at their works, No. 133 Mercer st., New York; where any further information respecting the patent can be had.

IMPROVED LATHE CHUCK.



Improved Lathe Chuck.

In this improvement there is a circular, hollow shell, composed of two pieces, A A′, combined together like the shell of a door lock. The jaws, B, between which the article to be held in the lathe is placed, slide to and from the center of the chuck. The jaws are made of solid pieces of metal; they have projections, B′, on their lower sides, in which projections nuts are cut to receive the screw bolts, C. By turning these screw bolts the jaws, B, are moved in or out. The outer ends of all the screw bolts, C, are furnished with spur wheels, D, which mesh in the circular rack, F; if a wrench is applied to the square head of either one of the screw bolts, C, all of the bolts will simultaneously move, and carry their respective jaws. The jaws may, in this manner, be rapidly run up to gripe an article, and then each screw bolt may be separately tightened by the wrench; all back lash is thus taken up, and the gripe will be fixed with great force.

Another advantage of this method of moving the jaws is, that the threads of the screw bolts can be made coarser, and therefore stronger, while the coarse thread enables them to be run up more rapidly.

In most chucks the face plate is slotted from the periphery up to the center, in order to receive the jaws; and the plate being thus divided, is rendered weak; in the present improvement the slots on the face plate radiate from the center, outwardly, but do not extend to the periphery; greater strength is thus obtained. An opening is made in the center of the chuck for the introduction of the jaws, and after they have been inserted, a plug, E, is put in and secured, flush with the face plate. The inner ends of the screw bolts, C bear against plug E, while their outer ends have bearings on the rims of the groove, in which the rack, F, moves; the force of the screw bolts, C, is thus expended against solid metal, in both directions, and the bolts cannot get out of place. G are bosses to support the shells; screws, G′, pass through the bosses and hold the shells together.

The rims of the groove in which the rack, F, rotates, fit together tight, and completely enclose the rack and spur wheels, so that dirt and filings are prevented from entering to do injury.

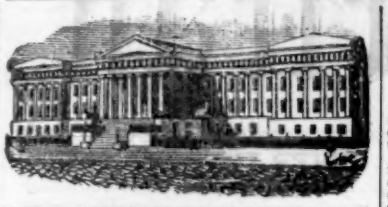
In other chucks, it is common to make the jaws, B, of two pieces, bolted together; thus formed they are weak, and after a time become useless; this objection does not exist in the above invention, as the jaws are entirely solid.

The foregoing improvement appears to be one of a very simple, strong, and useful character. It is the invention of Mr. Eli Horton, of Windsor Locks, Ct., who will be happy to give further information. Patented Nov. 13, 1855.

Chlorated Silver.

M. F. Kuhlmann, of Paris, has recently communicated to the Academy of Sciences a process which he has discovered for the formation of chlorated silver by the humid way. He fills a bottle or globe with a solution of nitrate of silver, and closes the orifice with some porous body; the bottle is reversed, and the orifice plunged in a bath of chlorohydric acid—taking care that no air penetrates into the bottle containing the solution of nitrate of silver—in such manner that the porous stopping may have one side in contact with the solution of nitrate of silver and the other in contact with the chlorohydric acid. After a short time the two fluids meet; and then there is formed on the top of the stopping, inside the bottle, a thin layer of chloride of silver precipitated. The re-action is continued slowly, and gives rise to an arborization of chloride of silver. The chloride is first white, and afterwards becomes of a brownish violet hue, and semi-transparent. The fracture is conchoidal and vitreous, it is of a soft consistency, and as fusible as ordinarily found chlorated silver. M. Kuhlmann infers, from this discovery, that as native chloride of silver is often found with metallic silver the formation of this metal results from the reduction of a portion of the chloride; for it has long been well known with what facility chloride of silver gives up its chlorine to hydrogen, as the latter is evolved.

The late Kentucky Legislature fixed the weight of a bushel of bituminous coal at eighty pounds, whilst that of cannel coal has been reduced to seventy pounds.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING APRIL 1, 1856.

SELF-INKING STAMPS.—Nathan Ames, of Saugus, Mass.: I claim in combination with the frame, A A, and shaft, C, the described arrangement of devices by which the type or printing surface is inked, and the impression produced by one downward motion of the hand, or other power applied to the perpendicular shaft, C, the inking roller, G, (being acted upon by two forces, the perpendicular and diagonal, as described) moving first over the bottom of the type block, E, and then over the back side of the same.

LUBRICATOR.—Edward I. Baker, of Baltimore, Md.: I claim the combination of the reservoir with the vertical stem or spindle by means of the conical sockets and bearings in the upper end and lower parts of the reservoir, together with the passages or openings which are in said sockets or bearings for the admission and discharge of the oil or lubricating fluid, and also for the escape of the air from the reservoir while oil or fluid is being poured into it, the said passages being alternately opened and closed by rotating or moving the reservoir around, or partially around the central stem or spindle, substantially as described.

BENCH VISE.—Benjamin G. Ball, of Nashua, N. H.: I am aware that a vise has been constructed so as to have one of its jaws movable on a rack bar and held in position by a pawl, while the other jaw was applied to a system of levers operated by a treddle and so as to move said latter jaw towards the first jaw, the same being described on page 739, Vol. 2, of Appleton's Dictionary of Machines, &c., published in New York in [illegible]. My vise differs essentially from this, and I only refer to it to show the principle of moving one jaw towards the other and upon a bar to which the other is applied and having said other jaw subsequently moved by other mechanism is not a new one, and that the principle of so constructing a vise is not what I claim to have invented, but that my invention rests on an improvement as described.

I claim combining with the rotary shaft, C, and the shanks of the jaws, A and B, the tubular screw connection and the clutch as described, when a rotary shaft is made to actuate the jaws, the whole being constructed and made to operate substantially in manner and for the purpose set forth.

MAKING SEAMLESS METAL TUBES.—Wm. F. Brooks, of New York City: I claim in the reducing die described composed of an annular series of radial rollers, the grooving or removing the corners of said rollers so that a series of parallel projections or ribs will be formed upon the tube, the rollers relieved from understrain, protected from choking and the reduction of the tube, and the withdrawal of the mandrel therefrom facilitated, substantially as set forth.

ROLLING RAILWAY BARS.—John W. Brown, of Mount Savage Iron Works, Md.: I claim so forming one or more of the grooves of the rollers, as shown substantially at 3, as to produce a depression or cavity all along that side of the bar which is to form the base of the rail previously to the reduction of the bar to form the neck, said cavity to be filled up by the displacement of the iron from the middle of the rail by the subsequent rolling operation, substantially as set forth for the purpose described.

REMOVING GRAIN FROM HARVESTERS.—Samuel Comfort, Jr., of Morrisville, Pa.: I claim, first, the employment in harvesters of the grated platform and radial grating, the same being constructed and operated in conjunction with each other, substantially in the manner and for the purpose set forth.

Second, the radial grating with its two rollers, s and s', shaft, F, and arm, G, as connected to the shaft, H, in combination with the curved plate, D, and its curved recess, d, (the said shaft, H, being actuated in the manner set forth or any equivalent to the same) for the purpose of turning over the said radial grating and clearing it of the grain or grass.

Third, the arm, G, with its projection, R, recess, r, jointed inclined plane, Q, in combination with the shaft, P, its cranked portions, t and p, and roller, h, for the purpose of giving the grated platform the desired vertical movement.

BREECH-LOADING FIRE ARMS.—Hezekiah Conant, of Hartford, Conn.: I do not claim the self-adjusting thimble, constructed and operating in the manner as represented in I. D. Green's patent, June 27, 1854.

Neither do I claim a sliding collar on the breech forced against the end of the barrel by a spring acting on a trigger as in J. C. Daye's patent, Dec. 18, 1855.

Nor do I claim a cone headed pin in the breech, which pin has two or more expanding metal rings acting on the cone as in Joslin's patent, Aug. 28, 1855.

But I claim inserting a metal ring into the slide with the chamber in rear of said ring, as shown and represented, and for the purposes substantially as set forth.

STEAM BOILERS.—F. P. Dimpfel, of Philadelphia, Pa.: I claim in the construction of a steam boiler the arrangement of the tubes and the connection of a receptacle substantially such as described for consuming the fine particles of coal which are carried by the force of the blast or draft from the fire-chamber into the flues, the said receptacle being placed below the bottom of the main flue and communicating therewith and between the fire-chamber and a check or deflector in the main flue, to check the momentum of the particles of coal and cause them to drop into the receptacle to be consumed, substantially as described.

I also claim in the construction of the boiler substantially such as described, forming a single flue in the middle for the passage of the products of combustion from the main flue surrounding the water tubes to the smoke box by securing the rear ends of the water tubes to two tube sheets, one half to each of said tube sheets, and leaving a space between the two tube sheets for the passage of the said middle flue, when this is connected with a check or deflector placed in the main flue among the water tubes and in front of the said middle flue, substantially as described, to prevent the products of combustion from taking a direct course to the said middle flue, as described.

And finally, I claim arranging the bent up ends of the water tubes where they are connected with the crown sheet of the furnace in a series of double longitudinal rows, and leaving spaces between the double rows of greater width than the external diameter of the water tubes, substantially as described, to admit of taking out and inserting the tubes, whilst in other respects the said tubes may be placed as near to each other as may be desired.

GRAIN HARVESTERS.—Augustus Elliott, of San Francisco, Cal.: I claim, first, forming the cut grain into sheaves or bundles by means of a series of endless bands and rollers having an intermittent motion, substantially as described.

Second, the spring apron, v, constructed substantially as described and for the purpose specified.

HYDRANT.—Henry English, of Baltimore, Md.: I claim the combination of the square shanked valve and its seat with the cap piece, in the manner and for the purposes substantially as described.

PRINTING PRESS.—George F. Folsom of Roxbury, Mass. I claim first, the method described of giving the impressions with the two plates by means of the gear, K, and double cranks, s, operating in the manner substantially as set forth.

Second, the method described of feeding the sheets into the nippers by means of the binder, T, in combination with an intermittent feed, operating in the manner set forth.

SLIDE RESTS.—Albert V. Hill, of Hinsdale, N. Y.: I claim the use of the slide mortise, K, driving screw, C, arranged and operating in connection, as described.

CLOTHS FOR FELTING HAT BODIES AND OTHER ARTICLES.—Wm. Fuzzard, of Charlestown, Mass.: I claim the employment or use of a corrugated apron, G, constructed of any proper material, substantially as and for the purpose specified.

JOURNAL BOXES FOR R. R. CAR AXLES.—William B. Gage, of Louisville, Ky.: I am aware that boxes for railroad axles have been made with an outer and an inner cell below, the inner one to contain cotton waste and oil, and provided with springs to keep the waste up against the journal to lubricate it.

And I am also aware that one-half of the box has been made movable and self adjusting to the journal by springs, and therefore I do not claim broadly the use of an adjustable cell for containing cotton waste and oil. Nor do I claim broadly the use of a self-adjusting half box.

I claim in a railroad box made with the cap box secured to the lower or main box or cell, which latter is formed to receive an inner box or cell to contain cotton waste and oil or other lubricator making in this combination the inner box or cell with projecting lips as described, which embrace the lower half of the journal, to fit and slide in recesses in the sides of the brass or cap box, substantially as described, so that when the journal is inserted and the inner box or cell is forced up against the journal by the springs the whole circumference of the journal shall be embraced to prevent the entrance of dust and waste of oil and yet permit the inner box or cell to approach the upper box as the surfaces wear, as described, the fitting of the lips of the inner cell within the recesses of the cap box permitting the two to approach and recede from each other without a break for the escape of oil in the circle of the surfaces which embrace the journal, as described.

MANUFACTURING AUGERS.—George G. Griswold, of Chester, Conn.: I claim the form of the plate required for making the twist to the auger or bit.

AUTOMATIC STEAM WHISTLES.—Jas. Harrison, Jr., of Milwaukie, Wis.: I claim the described apparatus, consisting of the spirally slotted or grooved cylinder, A, for connection with and operation by the locomotive detachable and adjustable lifters, f f1 f2 f3, of varying thicknesses length or breadth and lever, D, or its equivalent, in combination with and for operation of the whistle, E, substantially as and for the purposes set forth.

MORTISING MACHINE.—Edward Joslin, of Keene, N. H.: I do not claim the application of a spring to the tool carriage in order to lift it.

But I claim combining or arranging as specified with the tri-armed sectional lever, K, and the post or frame of the tool carriage two wooden springs, L M and a, connecting rod, O, and so that one spring may be separated by draft and the other by pressure when said lever is placed downward, as explained, the same effecting advantages as set forth.

LIFE-BOAT.—George W. La Baw, of Jersey City, N. J.: I claim arranging the carriage or inner boat upon pivots, so as to allow the outer boat to rotate over and around the inside boat or carriage which always retains an upright position when constructed and operated substantially as described.

FORMER FOR SPIRAL SPRINGS.—Vincent D. Lent, of Chelsea, Mass.: I am aware springs might be made on conic frustra of such an angle that the parts of the spring wound at right angles to the axis of such a former would not coincide so nearly with other parts of the spring that contact between them would follow compression. Springs made upon such a former, however, would have an unnecessary amount of material. I do not claim such a former.

I claim a former so constructed with suddenly expanded ends, as set forth.

SPARK ARRESTERS.—Stemmel Lutz, of Philadelphia, Pa.: I claim the combination of the plate, D, branch pipe, B B, and the cap or reservoir, C, provided with a central cavity, G, or its equivalent in its upper end, arranged and operating substantially in the manner and for the purposes set forth.

CONVERTING RECIPROCATING INTO ROTARY MOTION.—Robert Moffett, of Bradford, Pa.: I am aware that opposite semi-toothed pinions have before been used in combination with racks for converting reciprocating into rotary motion. I therefore make no claim to such, neither do I claim the use of guide grooves and lugs on the racks by themselves.

But I claim the arrangement of the laterally projecting lifting teeth, f f, on the semi-pinions, in combination with the guide grooves, H, and lozenge projections, L, substantially as described.

MITERING BENCH.—J. W. Mahan, of Lexington, Ill.: I claim the peculiar construction of the miter box or its equivalent as shown, the advantages it possesses over any other in use being, first, so constructed that it never wears out by the teeth of the saw cutting the box, as is the case in ordinary boxes.

Second its easy combination with the other devices in my machine for accomplishing the various results which can be accomplished perfectly by any one whether skilled or not in the ordinary way of accomplishing said results, viz., laying off and cutting picture frames, door and window frames, tenoning sash, &c.

I also claim its combination with the other devices represented substantially as shown.

GATHERING SEEDS OR GRAIN IN THE FIELD.—Thos. E. Marable, of Petersburg, Va.: I claim in combination with a gatherer for drawing in the heads the rubbing board, having a vertical movement for receiving the heads under it, and then dropping down and having a transverse rubbing motion for rubbing out the seeds or grain, substantially as described.

WRENCHES.—Philip McManus, of Brunswick, N. Y.: I do not claim separately a cam or eccentric for holding or securing the sliding jaw at desired points.

But I claim the cam or eccentric, H, attached to the sleeve, E, and the rack, F, attached to the sleeve by a spring, G, in combination with the rack, a, on the shank, B, the above parts being arranged substantially as shown and described for the purpose specified.

I further claim in combination with the cam or eccentric, H, and racks, F a, the finger piece, A', as described.

WIND WHEELS.—Francis Peabody, of Salem, Mass.: I claim the method described of hanging and arranging the two wheels, and adapting them to the opposite ends of a permanent building, the wheels with their regulating disks being secured to the revolving turn-tables at a distance from the point around which they revolve, equal or nearly so to one half the width of the building, whereby wheels of great diameter may be employed in connection with a permanent building of any required dimensions, as set forth.

Second, I claim the weights, s and p p, with the chains, Q2, or their equivalents, in combination with the disks, C2, for the purpose of regulating the motion of the wheel, to the varying force of the wind, as set forth.

AXLE BOXES FOR CARRIAGES.—E. M. Stratton, of New York City: I do not claim the making lateral grooves in large, part of my mail axle boxes, in which to fit the heads of short bolts to supersede long bolts, as described and claimed by Wm. H. Saunders.

Nor do I claim long bolts passing through carriage hubs to fasten them upon mail axles, the same being outside of and disconnected from the box as heretofore used.

But I claim plain longitudinal channels across the enlarged portion of mail axle boxes, adapted to and in combination with long bolts for fastening carriage wheels upon mail axles, by which combination the long bolts are brought close to the small portion of the box, and the whole so compactly grouped together as to adapt mail axles and boxes, and long bolts to small hubs, such as are now required for light and fashionable carriages, substantially as described and shown.

I claim also the combination of plain longitudinal channels, made across the enlarged portion of mail axle boxes, with reverse channels made in corresponding portions of the hub, when the box and hub are fitted for and combined with the long bolts acting therein as keys between the box and hub, as seen in fig. 2, for the purpose of securely fastening the box in the hub by means of the long bolts, which thus perform the functions of keys and dispense with the necessity for injuring the hub, by splitting and wedging the same, as has heretofore been necessary in all cases for fastening axle boxes in carriage hubs, whereby I preserve the whole strength of the hub, and materially cheapen the cost and labor of fitting and fastening the box therein, substantially as described and shown.

VALVE GEAR OF OSCILLATING ENGINES.—Wm. Stephens, of Pittston, Pa.: I claim the described arrangement of the slotted plate, G, in the slide, h, or its equivalent, for the purpose of adjusting and varying the lead of the valve, substantially as set forth.

WHEELWRIGHT MACHINE.—John Sitton, of Williamstown, N. C.: I claim, first, the double-faced wheel, B, working upon an axle, and made strong by flanges on the axle, upon which the blocks from which the fellies are cut are secured by the clamps, D, substantially in the manner and for the purpose set forth.

Second, the construction, operation, and use of the clamps, D, in the manner and for the purpose specified.

Third, the construction, arrangement, and operation of the knives or cutters, E, in the manner and for the purposes set forth.

Fourth, the construction and operation of the grooved wheel, fig. 2, in the manner and for the purposes set forth.

Fifth, the felly meter, S, constructed and operating in the manner and for the purposes specified.

Sixth, the arrangement of a carriage or other wheel, M, to the finishing wheel, L, in the manner and for the purposes set forth.

All other parts and operations of the machine I disclaim.

LATHE.—H. C. Spalding, of New York City: I claim first, attaching the cutters, E, to the cutter heads, D, by having the shanks, b, of said cutters fitted in taper grooves, a, which are made in the sides of the cutter heads, the inner ends of the grooves being wider than the outer ends, to permit the proper adjustment of the cutters, as described.

Second, I claim the shaft, T, when arranged substantially as shown, so that it will rise and fall curvilinearly, and be at equal distances from the arbor or shaft, C, at any point of its movement, so that power may be applied to the gearing which operates the adjustable and reciprocating carriage, F, from the stationary arbor or shaft, C, without changing the lengths of the driving belts.

Third, I claim holding or securing the sticks to be operated upon by means of the jaws, s s, operated by the grooved drum, p, lever, G', and plates, u u, substantially as shown and described.

Fourth, I claim the hub, J', arm, K', with pawls, a' b', attached and operated as shown, for the purpose of rotating or turning the sticks the requisite distance between the centers at each movement of the carriage, so that the sticks may be cut with any desired number of sides.

Fifth, I claim arranging the belt shipper, N', substantially as shown, viz., with a hooked lever, Q, and pendant lever, R', and spring, P', and having a projecting pin, f', attached to the side of the hub, J', so that the driving belt of the machine will be thrown off the driving pulley at each entire revolution of the hub, J', so that the finished work may be removed from the machine, and fresh sticks placed between the centers.

SOLDERING WIRE FERRULES.—Asahel Pierpont, of New Haven, Ct.: I claim the employment of the jaws, c c c c, with the cone, d, and fork, D, or their equivalents, when the whole is constructed, combined, and made to produce the result in a manner substantially as described.

STIRRING STRAW AND HUSK BEDS.—C. A. Richardson, of Waterville, Me.: I claim the mode of constructing said instrument, for the purpose of stirring fillings in beds.

FORGE FIRES.—Wm. Rodgers & Abraham Bannon, of Bellefonte, Pa.: We claim the forge hearth, C, as described, when employed in connection with the tuyeres, D and A, operated by the lever, B, the whole arranged and constructed in the manner set forth.

STEAM ENGINE PUMPS.—John R. Sees, of New York City: I do not confine myself to the particular arrangement of my improvement, as it is equally applicable to pumps attached to locomotive, stationary, and marine engines, and the arrangement may be varied to meet the different applications of it.

I claim the use of an intermediate arm or lever between the moving power that works a force or supply pump attached to a steam boiler, and the pump, with an adjustable sliding block movable on said arm or lever, as described, or any analogous arrangement, substantially the same which will produce the desired effect.

FIELD FENCE.—S. G. Tufts, of Wainsville, Ohio: I claim constructing fences in distinct and separate sections, connecting the same by adjustable links and wedges at their upper corners, and supporting said sections by chairs placed between and at right angles thereto, substantially as described.

GRAIN AND GRASS HARVESTERS.—G. W. N. Yost, of Pittsburg, Pa.: I claim the combination of the racks, b b b'b', and king bolt, k, arranged as set forth, for adjusting the cutter bar of harvesters.

DOOR SPRINGS.—Alvin Barton, of Syracuse, N. Y. (assignor to himself, A. R. Morgan and J. M. Parsons): I claim the employment of eccentric cog wheels, E and F, as described, in combination with the coiled spring, lever and guide rod, attached to the door or gate, as set forth.

BRIDGES.—G. W. O. Huygen, of St. Louis, Mo. (assignor to himself, Chas. Bender, and D. F. Tiedeman): I claim that combination of and between those mechanical agencies and technical parts which constitutes the described mode to prevent vibration in a bridge by using the compensated effect of compression only as carried out and brought in application in the described compensating bridge.

I claim the combination of and between the mode in which the arches are arranged and cross each other, and the mode in which they are connected with the floor, and finally the mode in which they receive their leverage, as described, the mechanical effect of which said combination is to originate the tendencies in the upper and lower arches to curve apart or asunder.

I claim the combination of and between the mode in which the arches cross each other, and the mode in which they are connected with the floor; and the mode, finally, in which they are constructed in regard to amount of material; as described, the mechanical effect of which said combination is to orignate the equal intensity of the said tendencies.

I claim the employment, in bridge construction, of the described arches, arranged and connected as described, as a practical substitute for upper cords, and generally for all such parts in bridges which serve to uphold the floor.

I claim the special mode in which the described arches are connected with the floor.

CARPET LINING.—J. R. Harrington, of Dayton, Ohio: I claim, first, the arrangement of the horizontal spindles or rollers, b b', in which the outer sheets or rolls of paper or cloth are wound in combination with the intermediate spindle, e, on which the inner layer of cotton or other filling is wound, the whole being supported and operated in the manner and for the purposes substantially as described.

Second, I claim the arrangement of the rolls, h h', in combination with the spindles, b b', &c., for the purposes substantially as set forth.

Third, I claim the troughs, p p', that contain the size or mucilage, and the brushes, q q', that administer it when used in combination with the spindles, b b', &c., the whole being arranged and operating in the manner and for the purposes substantially as specified.

Fourth, I claim the creasing rolls, j j', when used in this connection, each having alternate grooves and ridges at the requisite distance for the folds, for the purposes of folding and measuring, substantially as described.

Fifth, I claim, in this connection, the box or platform, m, placed below the delivery of the rolls, and having a falling front, n, as explained.

SKATES.—Fernando Klein, of Newark, N. J.: I do not claim the wooden stock, A: neither do I claim the plate, b, nor the skate iron, c.

But I claim the iron bar, a a', attached to the heel plate, and having two knobs, d d, for the purpose substantially as described.

FISHING LEAD.—Wooster Smith, of South Thomaston, Me.: I claim the improved shape of my lead, the improved mode of fastening the long part of the fish line to the swivel in the top of the lead; the cap of iron, brass, or other hard metal on the bottom or descending end of the lead, the horse line running through the lead at the bottom end, the swivels and rings attached to the ends of said horse line, to which rings of the swivel the small lines to which the hooks are attached, and said swivel in the top of the said lead, to which said long part of the fish line is fastened as aforesaid.

DESIGNS.

CLOCK CASE FRONTS.—Nicholas Muller, of New York City: I claim the female figure, C, peacock, D, and foliage, E, when arranged and combined as shown.

PARLOR STOVES.—S. H. Ransom, of Albany, N. Y.

STOVE PLATES.—S. H. Ransom, of Albany, N. Y.

SIX PLATE STOVES.—S. H. Ransom, of Albany, N. Y.

COOKING STOVES.—S. H. Ransom, of Albany, N. Y.

ELEVATED OVEN COOKING STOVES.—S. H. Ransom, of Albany, N. Y.

Our Foreign Correspondence.

NAPLES, March, 1856.

The introduction of new inventions into this oldest portion of enlightened Europe, is progressing so slowly, and the genius of the people seems so obstinately bent in a contrary direction, that I verily believe a premium would be paid by the various Governments to prevent the importation or introduction of labor-saving machinery. So unwilling are they to encourage any one attempting to do away with any of the manual labor now employing their mechanics and peasantry, that a high tariff is placed upon most of the articles that could easily be sent here. In one respect their policy is beneficial to the few rulers of the country, as it keeps the minds of the people from ever looking above their labor to the acts of their government. But, taking another view, these petty sovereigns lose all the profits, and the increased importance they might gain by turning out a larger amount of articles for exportation. This country is a prolific one, but its resources are not, nor have they ever been properly developed. With one of the finest climates in the world, and most industrious inhabitants, Italy seems still to remain where it was two centuries ago. During four months' residence, I have seen but one American invention, and that was one of McCormick's reapers. It was a second-hand article at that, imported from London by a Neapolitan nobleman, who, no doubt, *intended* to use it upon his estates. It was looked upon by the common people as an infringement of their rights; and perhaps, if they had the inventor conveniently near—they might proceed to violent measures. I found it in the yard of the largest machine shop and foundry of Naples, where it had lain since being received from London, and in all probability will there remain in the absence of a man to make use of it. I was informed, by one of the firm, that they had orders to make a duplicate; but as yet, had not succeeded.

With an energy that does him credit, the King of Naples has turned his attention to creating a steam navy, and to that end is now remodeling all his sailing vessels, fitting them with engines and screw propellers. He makes known that he will adopt the latest improvements; but he does not make known the extremely small price he is willing to pay for them. He has already constructed some twenty war steamers of all sizes, and now possesses the requisite manufactories for producing others. By the politeness of some of his officials, I was enabled to visit his "Marine Arsenal," or, as we should call it, his Navy Yard—where I found nearly every portion of the works exhibiting considerable activity. The "bosses," however, were mainly American or English mechanics, who were doing the best they could towards teaching Italian ideas how to shoot."

The whole establishment—foundries, machine shops, dry docks, arsenals, yards, etc.—of this government, would scarcely equal a combined machine shop and ship yard of the Empire City, except, perhaps, in the greater ground space occupied. Some of the castings, however, would do credit to any establishment. The men seem to understand the principle of thoroughly ventilating the mold with copper tubes, before pouring into it the heated metal. In the turning shops I saw a number of castings, which, for closeness in grain, would compare favorably with any made elsewhere. The rigging blocks were all made by hand, as well as many other articles, which, in our country, are so expeditiously manufactured by the aid of steam machinery. I saw several workmen making barrels and kegs; first, they curled the hoops, then fashioned the staves to match them; they then "set up" the staves, paring them down until they fitted within the hoops. When this had been done satisfactorily, they laid the barrel or keg down on its side, and built a fire of shavings in the interior, rolling the fire around inside, to warp up the ends and catch the heads, which were secured in their places by straps on the outside. I witnessed the whole operation, from the "roughs" to the rudely finished article, marveling much that science should be so very far behind in the Navy Yard of the King of Naples.

J. P. B.

(For the Scientific American.)

The Cornish Steam Engine.

Circumstances have put it out of my power sooner to finish and forward to you this communication. It was commenced immediately on reading your remarks appended to my article on page 123, in which my endeavor was to compress what I had to say into the smallest possible space; and I was satisfied to state merely such facts as would lead to further investigation on the part of those interested in the economical use of steam power.

In your remarks at the close of my former article, you propound to me the following queries; which, with pleasure, I will endeavor to answer:

First, "Should not the double-acting condensing engine of 35 3-8 inches cylinder, be considered of equal area with the Cornish engine of 50 inches?"

I answer, Certainly. In my communication of the 29th ult. I was comparing engines of the same power, giving to the double engine every possible advantage, and yet claiming a decided superiority for the Cornish engine.

Your other query is, "*Why* is this superior economy?"

It is, first, because a portion of the steam used at any time is made effective in the next stroke of the engine.

But this will be better understood by giving an outline account of the working of the Cornish engine.

Sufficient steam is introduced at the top of the cylinder to force the piston down; the equalizing valve then opening allows the steam to pass from the top of the cylinder, through the equalizing pipe, to the bottom of the cylinder; this being but a small space when compared with the whole content of the stroke of steam, reduces it but little. The piston then ascends at the required speed (this is regulated by ballast,) and before it reaches the top of stroke, the equalizing valve closes, preventing any further escape of steam from the top of the cylinder, the piston compressing the remaining steam until the engine is brought to a stand. This is intended to overcome momentum, and to prevent the piston from touching the cylinder head, serving as an elastic cushion between the two. But it also is an item in the economy of the engine; for this compressed steam, filling the ports and the space between the piston and cylinder head generally ranged from 1 to 3 lbs. per square inch above the pressure of the expanded steam—reduced as above—in the descent of the piston and the operation of equalizing, thus requiring so much less steam for the next stroke.

For example, take a fifty inch cylinder loaded to an average pressure of fifteen pounds per square inch on the whole stroke, but being introduced at a sufficient pressure (say 27 lbs.) to expand three-quarters of the stroke, and reducing the steam at the end of the stroke to about 7 lbs., and when equalized, to about 6 1-2 lbs. This steam, when compressed as above, at the upper end of the stroke, will be of say 8 1-2 lbs., pressure per square inch on the piston, left behind, as it were, from the first stroke, again to become effective in assisting in the second stroke.

This superior economy is, in the second place, because steam is used expansively, with more effect, in the Cornish engine, than is possible in the crank engine.

Steam being introduced at a high pressure into the cylinder, the piston commences descending rapidly, and acquiring a momentum which carries it (the steam valve having been closed) beyond the point where the reduced steam ceases to be effective, the engine will then turn her stroke, and the piston will ascend some considerable distance without the intervention of valves; and so complete is the turn that a stranger to this motion would think the engine attached in some way to a crank. This expansion is in a great degree rendered effective by the mode of attachment, (I speak of pumping water in the usual manner with the Cornish engine.)

The engine raises a weight, and it is the descent of this weight that forces or raises the water, thus permitting great rapidity of motion of piston when steam is applied.

From this mode of operation, the balanced (commonly called "cornish") valves and the general simplicity of its construction, there is little or no friction attending its working—so little, indeed, that in calculations nothing is allowed for it, and in an engine of 75 horse power, not more than a pint and a half of oil is used per week of 168 hours, the piston getting tallow.

In the crank engine, although the steam may be cut off at the same point as in the Cornish engine, yet from its construction (its motion being regulated by a fly wheel,) the same degree of rapidity during a part of its stroke is not practicable nor even desirable. The fly wheel shaft would break off before such a motion were attained.

Again, in the Cornish engine the power is applied at the extremity of the weight to be moved, while, in the crank engine, it is applied near the center, being subjection to a friction caused not only by the heavy fly wheel, but also by the whole power of the engine pressing on the journals of the shaft. And, further, I am of the opinion that there is a vast deal of the power of the engine absorbed by the fly wheel.

The superior economy is, third, because there is not so much leakage of steam in the operation of the Cornish engine as in that of the double engine.

Theoretically, pistons are steam tight, but practically there always is more or less leakage, and that engine to whose piston, steam direct from the boiler is applied for the longest period in a given time, is of course liable to the greatest amount of leakage. Now let us compare the two engines under consideration: let them each have ten feet stroke and ten strokes per minute. In the Cornish engine the piston will descend, steam being applied in, . 1 1-4 seconds
the piston will turn at bottom in 1 do.
the piston will ascend in . 2 do.
and will turn at top of stroke
and condense the steam in . 1 3-4 do.

In the double-acting engine the piston will descend, steam being applied in . 2 seconds.
and turn at bottom of stroke in . 1 second.
ascend, steam applied, in . . 2 seconds.
and turn at top of stroke in . . 1 second.

These tables I do not pretend are mathematically correct to the most minute fraction of a second, yet they are near enough correct for all practical purposes.

By examining them it will be found (there being in the case of each engine ten strokes per minute) that, in the Cornish engine, steam direct from the boiler, is on the piston 1 1-4 seconds per stroke, and consequently 12 1-2 seconds per minute; while in the double-acting engine steam is on the piston 4 seconds each stroke and 40 seconds per minute. Hence, in the matter of leakage, the ratio between the two is as 12 1-2 is to 40. But this is not quite a fair comparison, the cylinder of the Cornish engine being larger in bore than that of the other, the ratio between the two in this respect being as 1 1-2 is to 1. Now, by working out these proportions we find that the double-acting engine is liable to more than one hundred per cent. more leakage than is the Cornish engine.

Let it be further understood, as it were, as a corollary to the foregoing proposition, that the Cornish engine may be made to perform her up-and-down strokes at any required speed, or, in other words, is perfectly adjustable, thus admitting of the use of just the quantity of steam required by the amount of work to be done, or other circumstances attendant upon any particular case.

And in the fourth place, this superior economy arises because, in the Cornish engine, the condensation of the steam is more effectually performed than in the double-acting engine—a more perfect vacuum being formed.

To understand the action of the Cornish engine in this particular, I will proceed with the description of its working where I left off above, in the consideration of the first reason.

After the engine has been brought to a stand, the piston being again at the upper end of the stroke, the exhaust valve opens, and the engine rests an instant, the first jet of the exhaust forcing all the water, air, and vapor, from the condenser, then the injection valve opens, and the fresh stream of cold water effects instantaneously a more perfect vacuum than could otherwise be obtained—then the steam valve opens for the next stroke, &c.

The escape of the exhaust, the injection of water for condensation, and the admission of fresh steam in the Cornish engine, are each separately under the control of the engineer; and allowing the engine more or less time for condensation, is called by them giving her more or less "hark."

I have given a few reasons which I trust will be sufficient to lead to further research in this surprisingly much neglected subject—the economical use of the steam power. These are some of the points in which the Cornish engine has a decided advantage over the double-acting condensing engine. It seems almost impossible to give reliable mathematical demonstrations to prove all of its advantages,—the best tests I know of, after all, being the indicator and the coal heap.

In closing I would wish to notice Mr. Haine's remarks on page 147.

In his attempt to point out the absurdity of the principle, that "the economy of the engine is as the diameter of its cylinder," he overlooks the other long recognized and universally established principle, that "the piston should move through a space of from two hundred to two hundred and twenty feet per minute to perform economically.

It would be "absurd" in the extreme to add to the economy of an engine by an increased size of cylinder, and at the same time subtract from it by the neglect of some other well known principle.

There are double-acting condensing engines built by the same mechanics, under the care of the same superintending engineers, clothed and attended to in the same manner, cutting off their steam at the same point, and in the performance of which the same reputation is at stake, as is the case with the so-called Cornish engines. And yet the result is as stated in my former communication.

I would be glad could arrangements be made in such a way that the expenses should not fall upon single persons—to accept a challenge from Mr. H., to the effect that the two engines of equal power be tried next to one another, with a forfeiture if our engines will not perform as we say. I to be subject to the forfeiture if my engine will not do its work with twenty-five per cent. less fuel than his; he to be subject in like manner if it does.

JOHN WEST.

Norristown, Pa.

[We received the foregoing communication from Mr. West some time since, and have delayed it's publication for one particular reason. A short time previous to the appearance of Mr. West's article on page 123, this volume SCIENTIFIC AMERICAN, and since that period, this subject of the Cornish *versus* the common Double Engine, has been under discussion, week after week, in the *London Mining Journal*, and we waited to obtain a satisfactory conclusion of the whole matter, from that discussion. We must confess to a disappointment: none of the contributors to the above journal have explained the peculiarities of the Cornish Engine, nor pointed out its advantages in pumping as Mr. West has done in this communication.]

Magnetic Meridian

The term magnetic meridian has been applied to the line or direction indicated by a magnetic needle freely and delicately suspended on a center. These lines seldom correspond to the true meridian from pole to pole, and are perpetually varying in their direction, not only from general causes, but also from local effects. They frequently differ in the angle of variation, even in the same meridian, being often easterly in one place and westerly in another. One of the lines of no variation is considered to cross the center of Australia to the Indian Archipelago; but this cannot be depended upon. However delicately needles may be balanced in the northern hemisphere they become sluggish in their vibrations when brought to the southern hemisphere, in consequence of the tendency of the south end to drop, owing to its proximity to the south pole and its consequent increased influence; therefore all needles require re-balancing; the north end must be made heavier by means of a little wax or any other adhesive substance.

Should the magnetic variation at the place of observation happen to be on the contrary side to that supposed by the observer, and laid down accordingly on a map, it would lead to a very inconvenient error and to erroneous conclusions. Surveys made solely by compasses and without the usual checks for correcting the magnetic variations cannot fail to produce great confusion in the boundary lines between different properties. All territorial surveys and maps should be strictly made and laid down according to the direction of the true meridian. Numerous properties would be brought into endless litigation by the continual variation in the direction of the magnetic needle, if places were constantly laid down and measured from the local direction of the needle instead of the true. The direction of the magnetic needle in England about 250 years ago was 11° east of north; it is now about 24° west of north, and is constantly undergoing a slow oscillation. Besides progressive changes there are annual or periodical movements and daily oscillations constantly taking place in all parts of the world where magnetic observations have been made. This subject is very important, and should be well considered in a new country requiring a general survey and the marking of the divisions of properties. The surveys should be made on base lines and triangulations, and the direction of the magnetic needle indicated at the period taken and that specified and not taken for granted, and marked according to old observations.

Colored Poisonous Confectionaries.

At a recent meeting of the Select Committee of the British House of Commons, to inquire into adulterations of all articles sold for food, &c., Dr. Alfred Taylor, the celebrated professor of chemistry at Guy's Hospital, testified as follows:

Dr. Taylor stated that his attention had been directed to adulterations generally, but more especially to mixtures of poisons with articles of food. The first substance he would mention was 'Scheele's green,' which was formerly very extensively used to color confectionary, although the use of it had much decreased since the inquiries of the committee. Two or three grains of the poison would be sufficient to destroy life, and in 1854 no less than fourteen children had died from the effects of it. It was very much used as a pigment, and he had himself discovered it on the bottom crust of some loaves brought to his table, and upon inquiry, it was ascertained that the shelves in the baker's shop had been painted with this color.

There was no difficulty in substituting a harmless green in its place, but, owing to its bright color, it was much sought after. In the blue colors he had not found any thing injurious. In the reds, vermillion and red lead were used; and in the yellow, oxyd of lead and chromate of lead, which was very dangerous and had been the cause of the death of a child in 1853. With regard to all these colors, others might be substituted, which would be perfectly harmless, and the difference in cost would be of no moment. In France several orders had been issued forbidding the use of these substances, as well as many others. The extract of bitter almonds, which was very much used, was a most powerful poison, as it contained from 6 to 12 per cent. of prussic acid. Twenty drops of the oil had killed a woman 49 years of age in half an hour. A compound of it, called "almond flavor," was much used, but was very dangerous, there was an instance in which half an ounce had killed a woman aged 30 in half an hour.

The use of it by confectioners should be strictly forbidden, but at present there was nothing of the kind, and any quantity was sold. The prussic acid might be separated from the oil, and it was then free from danger; the flavor and odor were chiefly owing to the oil, quite independent of the acid, and there was no excuse for the use of it, except laziness and ignorance.

Sir David Brewster is now preparing a work on the Stereoscope, which will also embrace his views, in full, on optics in general. It will also contain a discussion on the subject, in which the views of others will be given.

New Inventions.

Submarine Telegraph Between America and Norway.

The Augsburger *Allgemeine Zeitung* contains the terms of an agreement concluded on the 24th of last January between an American company, represented by Mr. T. P. Schaffner, and the Swedish Government, relative to the laying of a submarine telegraph between the coasts of North America and those of Norway.

The telegraph company is permitted to lay a line of wires between the coasts of America and Norway, as well as to construct a telegraph station on the latter. On the other hand, however, the desired permission will not be granted to build a telegraph line through Norway. The Norwegian government will make arrangements that the telegraph line now in course of construction by the State from the frontiers of Sweden along the coasts of Norway as far as Mandal, shall be made to form a junction with the submarine line at a point to be selected between Stavanger and Mandal. The extension of a Norwegian line to a point further north than Stavanger, should such be chosen, may be the subject of further agreement. The Norwegian government further reserves to itself to determine all the details, both with regard to the construction of the line and of the station, and as to the conditions under which despatches either from or to America may be transmitted through Norway over the State lines now existing.

The foregoing concessions are made on the express condition that the Company should possess the necessary means for the execution of the undertaking within five years from the date of the agreement, and further that within five years next ensuing, the entire line be completely finished.

These privileges are granted for one hundred years; but we believe the line will never be laid down. The right of laying down a line from the North American shore as part of the line to Ireland has already been secured by a company in this city.

New Rock Drill.

The rough, uneven, inaccessible situations of quarries, excavations, and other localities where rock drilling is generally required, together with the necessity of frequent changes of the drills from spot to spot, precludes the employment of cumbersome machinery, or the application of power by any of the ordinary methods.

To overcome these difficulties and furnish a cheap, powerful, and convenient substitute for hand drilling, is a problem that has long engaged the attention of inventors. The author of the improvement herewith presented believes that he has realized the great desideratum. He employs the power of water to operate the drill, the liquid being conducted to the machine through a common leather hose pipe. The flexibility of this conduit is such that it may be laid almost any where; for the roughness and unequalities of quarry places, tunnels, mines, &c., it seems to be admirably adapted.

The drilling apparatus, which is very simple, is supported on a frame, A, the various parts thereof being rendered adjustable by means of thumb screws, so as to be easily changed to suit the nature of the ground. B is a valve box, which receives the water from the hose pipe. C is the drill, the upper end being guided by passing through the yoke piece, C'; the latter is supported by the adjustable rods, D. The middle portion of the drill passes through a tube or sleeve, E, the upper and lower ends of which are furnished with conical cups, F F'. Openings indicated at G are made through the top and also through the bottom of the valve box, B; these openings are fitted with a valve, see fig. 2, so arranged that when the drill falls and the upper cup, F, is brought close down over the perture, G, the spring, L, pushes down valve K, which opens the apertures, G, and the water instantly spirts up with great power, strikes the inside of the cup, F, and lifts the drill; when the lower cup, F', reaches the underside of the box, B, the spring, L, comes in contact with the lower shank of valve, K, and pushes it up, which movement shifts the upper openings, G, and opens those below, whereupon the force of the water is thrown into the lower cup, F, and the drill is driven down. The drill is thus made to play up and down with great rapidity and power. H is a spring steel clamp placed in a yoke, I, immediately above cup F. The clamp is furnished below with jaw pieces, H' H', (see figs. 3 and 4,) which firmly grasp the drill. When the drill falls the extremities of H come in contact with the ring, J; the momentum of the drill causes H to spring a little, and to curve for the moment, as seen in fig. 4; jaws H, consequently, open slightly, and the drill thus has a chance to slip through tube, E, far enough to complete its cut; the jaws then seize the drill again, as firmly as before, the release and seizure being, of course, almost instantaneous. In this manner the drill follows the depth of the hole as fast as cut, while the lifting and thrusting operation regularly proceeds.

The drill is partially rotated at each stroke by means of feathers placed within cup, F; the water acts against the feathers and imparts the requisite rotation. The water, as fast as it operates the drill, gushes from the machine and falls upon the ground, filling up the hole and washing away the debris as fast as formed therein. One man, we are told, can attend to two or three of these machines.

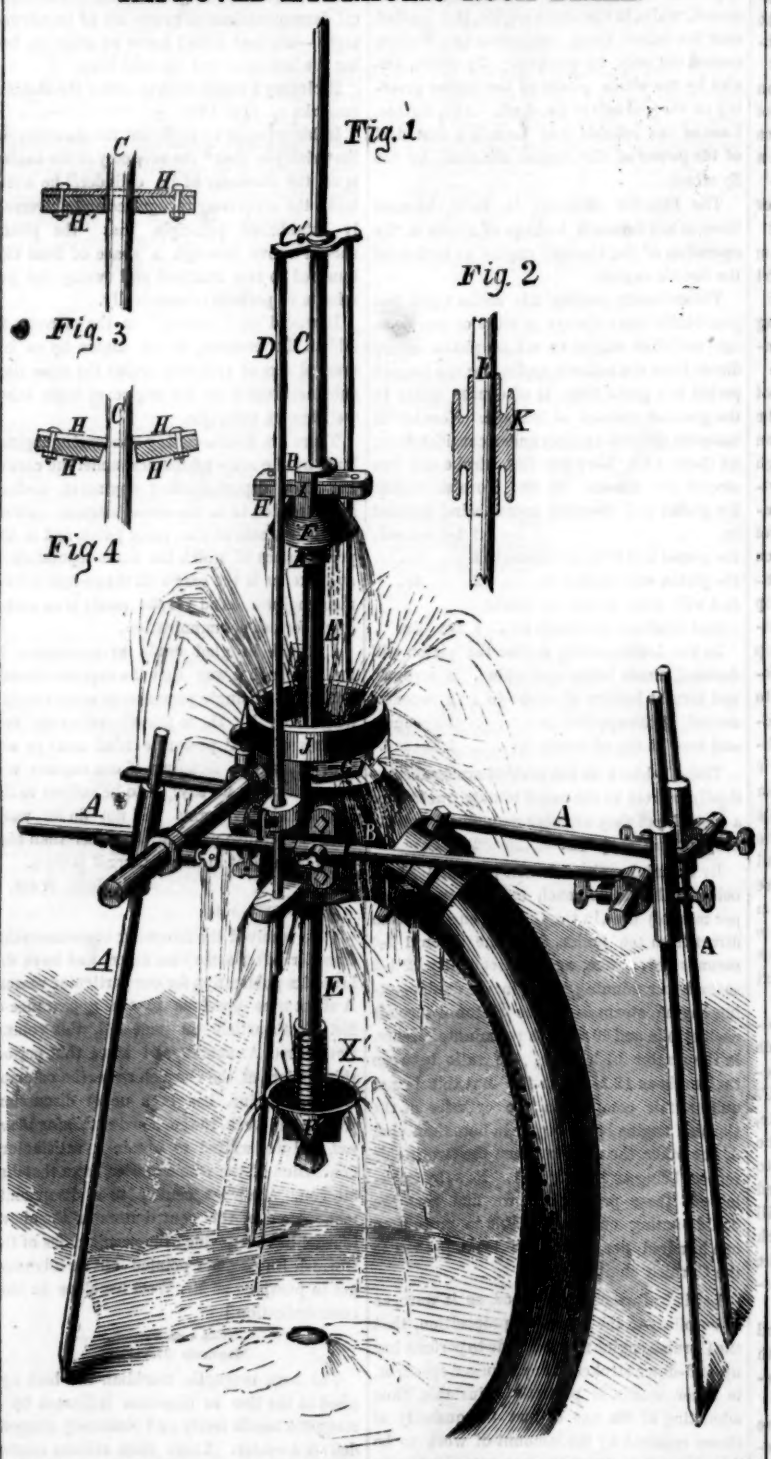
The machine is strong and extremely simple in all its parts. It will work on a horizontal thrust or at an angle, as well as perpendicularly. The flexibility of the hose pipe and the lightness of the machine renders it convenient for handling, change, or removal. Where the head of water is too low a pump driven by the water may be employed to force up water enough to drive the drill; in some localities a steam engine may be employed to drive the pump, the water being used over and several drills kept simultaneously in motion.

If desirable this machine may be applied to the dressing of stone, for which purpose one end of the drill should be furnished with a proper formed cutting tool; a valve would also be necessary, with which to regulate the force of the water. If a powerful quartz crusher is wanted the bottom of the drill may be furnished with a pestle, and a mortar placed below; in this manner the requisite rotatory motion of the pestle would be secured at any velocity, without gearing and at slight expense.

At the great Fair of the American Institute last fall, Crystal Palace, N. Y., this drill was exhibited in full operation, and attracted great attention. With an inlet water opening of only 2 1-2 inches and a head of 50 feet the apparatus made an average of 120 blows per minute, the stroke of drill being 17 inches, weight of drill 20 lbs., weight of machine 35 lbs.; it cut a hole in very hard stone 1 3-8 inch. in diameter, at the rate of one inch depth per minute. So admirable were the performances of the invention that a gold medal—the highest prize of the Institute—was awarded to the inventor.

This improvement is the invention of Mr. Josephus Echols, Columbus, Ga., of whom further information may be obtained. Patented March 25, 1856.

IMPROVED HYDRAULIC ROCK DRILL.



Writing Inks.

Good writing ink is something of great importance. It is employed to convey ideas, and make records of the deepest significance, both in the literary and mercantile world. Vast quantities of it are used, and its manufacture and sale employ many persons and a considerable amount of capital. The qualities of good writing ink should be, a deep rich color permancy, an easy flow from the pen, non-liability to injure pens or paper, and freedom from sedimentary action. We have lately used some ink obtained from Messrs. More, Clark & Co., Dayton, Ohio, which, when first written with, is of a green color, but it soon becomes a fine black, and gives evidence of permanency. It flows freely from the pen, and possesses the quality of remaining free from sediment in the bottles.

We have also used some of the ink made by Thaddeus Davids & Co., manufacturers of ink in this city, which is also of a green color when written with, but soon becomes of a deep jet shade. It also possesses the quality of easy flow from the pen, limpidness, and durability. A piece of paper was written upon with this ink and exposed to sun and rain on the roof of a building from May 9, 1855, to August 1st,—about three months; this severe test scarcely changed its shade. For permanent records, this ink of Davids & Co., appears to be the very kind so much wanted at present, as the more common inks become very faint in a few years.

Expensive Books.

In our last week's issue, on page 240, it was stated that it had cost the U. S. Government one and a quarter millions of dollars, to prepare and publish the account of Lieutenant Wilkes' Antartic Expedition. The information was derived from statements made in a debate in the U. S. Senate, on printing. Since then an explanation has been made by Senator Clayton, which puts quite a different face on the matter. The sum stated was for the whole cost of the Expedition.

Nitrate of Silver for Burns.

J. Wiltbank, M. D., in a communication to the *Medical Examiner*, Philadelphia, states that he has used nitrate of silver in solution as an excellent application for burns and scalds. He states that its results have gratefully surprised him. "It furnishes a complete protection to the inflamed surface, subdues the pain, arrests the serous discharge, changes the character of the inflammation, and promotes a speedy cure." From twenty to forty grains are dissolved in an ounce of water, and this is applied with a camel's hair pencil over the whole surface of the burn.

The Metals.

The ancients knew but seven metals—gold silver, iron, copper, mercury, lead, and tin. Antimony was first discovered by Basil Valentine, in 1490, and that by accident, while following his alchemical pursuits. Bismuth and zinc in 1530; while from 1733 to the present period there have been found no less than forty-nine new metals, by chemical research. These are known to be distinct in identity and characteristics from each other.

Gone West.

Hon. C. Mason, Commissioner of Patents has gone on a tour to Iowa. Will be absent about a month.

The Perpetual Motion.

Willis' "perpetual motion," exhibited in his city some weeks since, and illustrated in our paper, is, we are informed by one who knows, propelled by compressed air.

Coal in Turkey.

The coal mines of Kosloo, in Turkey, which were worked last year by an English company, yielded 43,000 tuns.

Scientific American.

NEW-YORK, APRIL 12, 1856.

Iron Steamships.

The loss of the steamship *Arctic*, by collision with the small iron steamer *Vesta*, which safely arrived in port; and the more recent loss of the *Pacific*, believed to have struck an iceberg, while the *Persia* did the same, and escaped almost uninjured, have been the means of attracting public attention in this city towards the safety qualities of iron ships.

As some of our daily papers have just been discussing the matter in a loose way—all of them seemingly being possessed of the notion that iron ships, built with bulkheads, are of but very recent origin—a brief history of their rise and progress will be of general interest.

From the *London Mining Journal*, we learn that John Neilson, an engineer, of Glasgow, and brother of the inventor of the "Hot Blast," issued a pamphlet in 1827, for the formation of a company to build ships of plate iron, and he pointed out their superiority over timber-built ships. Before that period he and others had built small iron vessels for canals; and he had thus acquired a practical knowledge of their advantages. He failed to form a company, but he laid down the keel of one 110 feet long in his own yard in 1828, completed it in 1830, and named it the *Fairy Queen*. It resulted in loss to him, but in gain to the public, for it claimed the attention of skillful engineers, and in 1833 a moderate sized iron steamboat, named the *Kilmunn*, was launched in Glasgow, and surpassed all others of her tunnage, both in beauty of model and in speed. After this, small iron steamers became common in Scotland, but it was not until 1839 that one of large dimensions was built, this was the *Royal Sovereign*, constructed by Todd & McGregor, builders and proprietors of the *Glasgow* and the *Edinburgh*, iron screw steamers, which trade between this port and Glasgow.

At that time there was a strong public prejudice against iron ships; they were believed to be more unsafe than timber ones, but the success of the *Royal Sovereign* dissipated all these ideas, and large iron steamers then began to multiply.

Glasgow is the chief city in Europe for steamship building. In 1853-4, no less than 250 iron steamships were built there—some of them of great size.

Nearly from their very origin, all iron steamships have been built with water-tight compartments, yet the *New York Tribune* lately stated that this method of building vessels is quite new, and that nautical engineers are ignorant regarding their construction, and that they do not know the strength of metal required for the compartments, according to the water pressure to which they may be subjected. This is certainly a mistake. The makers of iron ships (and indeed skillful engineers who never built one,) can easily calculate the exact strength of metal required for every bulkhead. The art of iron ship building is as well understood, and perhaps better, than that of wooden ship building. Iron steamships are more safe than timber ones: the principal material of which they are composed is incombustible, therefore they are not so liable to that most terrific of all calamities, "burning at sea." All our ferry and river passenger steamboats should be built of iron; we should at least—as we stated last week—like to see them compelled to have their boiler rooms encased with iron, and constructed in the same manner as fire-proof safes. Iron can resist collisions of any kind better than timber. If by accident, however, a hole should be stove in the hull of an iron vessel, it is more difficult to plug up or stop, than such a hole would be in a timber-built vessel, hence there is a greater necessity for having such vessels built in compartments, to prevent their filling and sinking suddenly, when damaged in the hull. Many iron ships, however, have been lost, although built in this manner. A few years since the *Orion* iron steamer was lost on the coast of Scotland from striking a rock; it sunk very suddenly, and a great number of passengers were drowned The *City of Glasgow*, iron steamer, left Liverpool for Philadelphia, about three years ago, and never was heard of more; it is believed she struck an ice berg. And no further back than the 18th of last month, the iron steamer *Curlew* struck a rock on the coast of Bermuda, and soon sunk; the passengers and crew, however, were all saved. We might mention many other cases to show that iron ships are not perfectly safe any more than timber ones, but those cited are sufficient. A timber-built vessel, however, if subjected to the buffetings of the *Great Britain*, when wrecked in Dundrum Bay, would have gone to pieces, yet that vessel is now a regular packet to Australia, and is nearly as sound as when first launched.

We also find it stated, on page 112, Vol. 10, *London Artisan*, that the chief surveyor of Loyd's, on an examination before a Government Committee, gave it as his opinion, in the case of the *Nemesis*, an iron steamer that struck a rock and was saved, that had it been a wooden vessel, and had struck in the same way, it would have been totally lost.

One great objection against iron ships, is their liability to attract the magnet or compass, and thus deceive the navigator in steering on his true course. The compasses of the *Great Britain*, it was said deceived the captain; and in 1853, the *Tayleur*, a fine new iron ship, was wrecked on the coast of Ireland, and the compasses were also blamed for this. Timber-built vessels are not subject to this danger; which is one advantage in their favor.

It has been stated that iron ships are not liable to be struck by lightning, but this is not correct, for W. Snow Harris mentions several cases of iron vessels having been struck.

In England iron ships can be built for about fifteen dollars less per tun than timber ones; and with the same outside measurement, an iron ship of 1800 tuns burden will carry 300 tuns more than a timber-built vessel.

The last number of the *Nautical Magazine* recommends iron bulkheads for wooden steamers, and it also states that the planking of a ship is its main safeguard from foundering. Iron plates, then, have immense advantages over wooden planks for the outside covering of ships; their edges can be made with flanges fitting snug into one another, and which, when rivetted, makes the whole hull tight as a steam boiler, and far more of a homogeneous whole than it is possible to make the hull of a timber vessel.

No iron ship has yet been built in our country, although there have been a few small iron steamers. But as ship timber becomes more scarce and dear, iron will be resorted to as a substitute; and it is a pleasing reflection that the art of iron ship building is ready made to our hands. No vast outlays of money will have to be made in experiments: they have already been made on the other side of the ocean, and we have their results before us in the construction of such steamers as the *Persia* and *Edinburgh*—the latter, in our opinion, being the most beautiful model of the two. Such vessels are not perfect, and no doubt our nautical architects and engineers will make improvements on them.

In science and art the whole world is now a republic; we learn from other nations, and they learn from us: there is a fraternity of interests and feelings among the men of science and art belonging to all nations; and their motto is, "improve and progress."

Silver and its Uses.—No. 1.

This is the whitest, and next to copper the most ancient metal. It is capable of receiving a most brilliant polish, and it reflects light and heat better than any other metal; hence a silver tea-pot is superior to that of any other metal for retaining the heat of tea. Silver ranks next to gold for ductility and malleability. It is harder than gold, still, it is easily cut with a knife; hence, a small portion of copper is mixed with it in making silver articles of common use, so as to render them harder and more durable. Next to iron and tin it is the most common metal used for domestic purposes. Silver can be volatized between the charcoal electrodes of a powerful galvanic battery, and when it is fused in an open vessel it absorbs about twenty times its own bulk of oxygen, which it again expels in the act of solidifying. It possesses the excellent property of not tarnishing in the atmosphere (unless in some situations where it is exposed to sulphretted hydrogen gas,) and for this reason it is well adapted for the shields of door-knobs, door-plates, &c.

Its chemical name is Argentum, its symbol Ag. It exists native in a pure state, as a sulphuret, as a chloride (horn silver) and is found combined with gold, lead, antimony, arsenic, &c. In the Copenhagen Museum there is a native lump of silver weighing 500 pounds which was found in Norway. It is often found in iron rocks, but at Lake Superior it is found associated with malleable copper. The native sulphuret is found in the form of crystals of a shining lead grey color. It is very fusible, and is one of the most common and richest of silver ores, being especially abundant in the Mexican mines. The chloride of silver is a rich ore, and is most abundant in the Chilian mines; it is often accompanied with masses of pure silver. The bromide of silver is found in large quantities in the district of Plataros, Mexico A large proportion of the silver of commerce is extracted by amalgamation from the argentiferous ores. The ores are mixed with ten per cent. of common salt and roasted in a reverberatory furnace in which the heat is raised gradually for the first two hours, to drive off the moisture, then it is raised to and continued at a red heat for four hours, when it is raised to a still higher temperature for about an hour, to decompose the salt. The roasting is now complete, and the charge is now raked out of the furnace, cooled, and passed through sieves. The lumps are then mixed again with salt and receive another roasting, after which they are cooled and ground to powder in a Chilian mill. The powdered roasted ores are now placed in a wooden barrel with 30 gallons of water to every 1000 lbs. of ore, and 100 lbs. of scrap wrought iron about one inch square. The barrel is then rotated or else a stirrer is placed inside, and the whole contents of the barrel stirred for about two hours. About 500 lbs. of mercury are now added, and the revolutions kept up for 16 hours, during which time the charge is often examined to add water, if required. The amalgamation of the silver with the mercury is generally completed in 18 hours, when the barrel is filled up with water, rotated about ten times, and left to stand for a few minutes, when the amalgam is drawn off, by a tap, into a proper vessel, and then squeezed through canvas bags to remove the surplus mercury. The remaining mercury is driven off by distillation, and the silver is afterwards obtained pure by cupellation. This is an expensive process for obtaining silver. No works for thus reducing it have yet been erected in the United States, so far as we know, but in North Carolina silver is obtained from ores by the smelting process, by the Washington Mining Company. The ore operated upon is chiefly brown sulphuret of zinc mixed with galena, copper, and iron pyrites, gold and silver, &c. The ore in lumps is roasted in the open air, then crushed to powder by stampers, and washed to carry off the oxyd of zinc and quartz. The roasting is never considered complete until all the zinc is converted into the soluble oxyd to be washed away. The reason for this is, that if any zinc were left it would carry off some silver and gold in the smelting operation. The ore when deprived of its zinc is smelted in a reverberatory furnace with charcoal powder, and is exposed to a current of heated air until the base metals are all oxydized and skimmed off, and the pure unoxydizable gold and silver left. This process is also tedious, but not so expensive as the amalgamating.

On page 88, this Vol. SCIENTIFIC AMERICAN, the process of Pattison for obtaining silver from lead ores is fully described, as is also the refining process, which is illustrated with a figure. Our lead ores are not treated for the small amount of silver they contain; and the copper of Lake Superior also contains too small an amount to be treated for its Argentum; valuable pieces of pure native silver, however, are sometimes found in these mines.

The Mexican and South American silver mines are the richest in the world, but a considerable amount of silver is also obtained from the mines of Spain, Germany, Sweden, Norway, Russia, India, China, and Australia It is believed that there is plenty of silver in California, but hitherto it has not attracted much attention; there is a "good time coming," however. The lead ores of England yield a considerable quantity of silver—about 25 tuns per annum of pure silver.

To Steamboat Inspectors.

We really hope that none of the Inspectors appointed under the New Law are becoming careless and untrustworthy, or so satisfied with their last years' vigilance as to consider they have laid up a store of good deeds to make amends for future delinquincies.

The charge here implied has an appearance of being founded on facts. Two steamboat explosions have already taken place on our western waters since the commencement of this year. The steamer *Belle* recently exploded her boiler on Sacramento river, Cal., and the steamer *Metropolis* exploded hers on the 27th ult. at West Columbia, on the Ohio river, by which three persons were instantly killed and five dangerously scalded. This accident has been attributable to a defect in the metal of the boiler, which is stated to have been tested by the hydrostatic pump, and to have withstood 210 lbs. pressure before she started on her last trip from Pittsburg to New Orleans. It is also stated that the steam in the gauge when the explosion took place exhibited only 110 lbs. pressure, and two sheets only in the center of the boiler was all that was torn away. There was no deficiency of water in the boiler, and no evidence of any sudden great increase of steam at the time of the accident.

We hope the Inspectors will do their duty in both the cases mentioned, and make a thorough examination into the causes of these explosions. It shows there must have been something wrong and not accounted for in this case, if the boiler exploded under 110 lbs. steam pressure and yet withstood 210 lbs. pressure a few hours before from the Inspector's test. A rigid inspection cannot be relaxed if the Inspectors desire to maintain their reputation, and execute the sacred and responsible duties of their office faithfully.

Recent American Patents.

Steam Whistle Blower for Locomotives—By James Harrison, Jr., formerly of Milwaukie, Wisconsin, now of New York City.—The steam whistle has come to be regarded, on nearly all our railroads, as the most effective and reliable signal of warning that can be adopted. Its invariable use is required by law in some States, not to mention the regulations of railroad companies. It is the engineer's duty to sound the whistle at every crossing, curve, bridge, &c.; but he has a great variety of other duties to perform connected with the guidance and control of the engine, fire, &c., which renders it almost impossible for him always to open the whistle at the exact moment or spot or for the proper length of time; yet safety requires that the alarm should always be sounded with the most unerring precision and certainty. The late terrible accident in New Jersey on the Camden and Amboy road is an instance in point; many other examples, less fatal to life, but highly destructive to property could be named.

Mr. Harrison's improvement consists in an attachment to the locomotive which is intended to sound the whistle at the proper moment and spot, independent of the engineer. It is a sort of mechanical watchman, always on the look out, never asleep, attention never, for an instant, diverted. At every crossing, curve bridge, station approach, locality of danger or other desired point, it sounds the alarm, and keeps up the shriek as long as needed, with a surety that it would be difficult to improve. Indeed, it is a part of the locomotive; so sure as the engine moves will the whistle be blown. The inventor provides a cylinder upon the periphery of which is a screw thread, furnished with a series of adjustable stops. The cylinder is rotated by connection with one of the truck wheels of the locomotive. The stops are arranged so as to come in contact with and lift the opening lever of the whistle. By adjusting the stops at the right distances

on the cylinder the whistle will always be sounded at the proper time and place whether the locomotive be running forward or backwards. This invention strikes us as being one of a very valuable nature.

Improvement in Hat Felting—By Wm. Fuzzard, of Charlestown, Mass.—The patentee is the inventor of a hat machine in which the felting is done by the employment of an endless apron moving over rollers, the hat bodies being placed between the folds of the apron. In that machine a plain apron was used.

The present improvement consists in corrugating or ribbing the apron so as to make it *felt* up the hat bodies better and quicker.—The ribs may consist of cords or other suitable material woven in or sewed on or between the folds, extending in right lines or angles across the surface of cloth.

Improved Hammer Wrench—By Philip McManus, of Brunswick, N.Y.—The invention consists in a new mode of sliding and securing the movable jaw, whereby the said jaw may be changed and made to accommodate itself to different sized nuts with greater facility than wrench hammers of the common construction.

Rolling Railroad Rails—By John W. Brown, of Mount Savage, Md —This invention has for its object the rolling of the rails into such forms successively as to cause all parts of the rail to be submitted, in the rolling process, to an uniform degree of drawing and compression, thereby preventing the separation of the head and flange, making all parts of the rail of equal density, &c. The improvement enables rails to be made perfectly sound with crystalline iron in the heads, which is far superior to fibrous iron, as the latter laminates or peals off, as many of our readers will doubtless have noticed on roads that have been in use for some time.

The present improvement consists in forming a groove or cavity along the center of the base of the rail after the reduction to form the head has been, to a certain extent, effected by the rollers, but before the further reduction to form the neck is commenced. By the subsequent operation of the rolls the middle of the bar is reduced, to form the neck which brings the rail nearly to the proper shape, drives the metal towards the base, and fills the cavity in the base before mentioned. The above appears to be an important and highly valuable improvement.

Improvement in Valve Gear for Oscillating Engines—By William Stephens, Pittston, Pa.—The object of this improvement is to adjust the "lead" of the valve, and to give it more or less lead, as may be desired. It is an ingenious and apparently practical improvement But in order to convey an understanding of the parts we should need diagrams.

Lathe for Prismatic Wood Work—By Henry C. Spalding, of New York City.—This invention relates to an improved lathe for turning polygonal formed articles, such as pianoforte and table legs, etc. The stuff is turned out into the desired form at one operation by an automatic arrangement of the several parts The machine works with great rapidity, and does splendid work, so we are told.

Improved Windmill—Mr A. Lempcke, whose invention we noticed a short time since, desires us to say that his residence is at Pleasant Mount, Wayne Co., Pa., instead of Mount Pleasant.

Recent Foreign Inventions.

Fire Escape Bedsteads—T. Dawson, England, patentee. The inventor in describing this invention says :—

"I make the side frames of a bedstead of a tube, and enclose within it several other telescopic tubes; I connect one end of the tubes by a swivel or other suitable joint permanently to the bed posts, and to these elongating tubes (or tubular parts) I attach a sacking or net by means of rings or other appliances. In the event of fire the head posts are drawn up to the foot posts by connecting rods, through which they slide. The fire-escape sacking or net is made to overhang the window, and the same operation also dislodges the tubes from the foot posts, against which they rested, by a rod being run out of them. The tubes now no longer supported by the foot, take their incline to the street, and are let down by unwinding a rope from the two cylinders, which act in such manner as to prevent the too rapid descent of the tubes and sacking. The persons escaping descend in the sacking to the ground."

New Arrangement for Screw Steamers—The *North British Daily Mail* states that A. Morton and E. Hunt, of Glasgow, have invented what they term "the parallel action Z-crank engine," by which the two cylinders can be placed on parallel lines with the shaft, and their piston rods yoked directly to it. This arrangement is held to be a great improvement over the present plan, which requires the cylinders to be placed athwart the ship—one on each side of the propeller shaft. By the new arrangement the piston rods of the engine have their thrust in a line with the length of the vessel, thus obviating transverse vibration, the use of common cranks, and allowing the machinery (if required) to be packed near the stern of the ship.

Egg Powder.—W. C. Thurgar, England, patentee. The nature of this invention consists in taking fresh eggs, breaking them, and placing their matter in proper shallow trays, where they are subjected to a stream of moderately hot air to evaporate all the moisture When perfectly dry they are reduced to powder in a proper mill, and are employed for the making of pastry, &c. The air for drying the eggs must not be allowed to exceed 130°; the object is to evaporate the moisture and not coagulate the albumen, so as to render the egg powder soluble in water. This manner of preparing eggs for market might be pursued by some persons in our distant rural districts with as much profit as preparing and drying fruit. We throw out this hint for the benefit of "all whom it may concern."

Musical Notation—W. Striby, London, patentee, has taken out a patent for a new system of musical notation, the object of which is to reduce all the musical clefs, scales, and systems to one single scale, or rather, a single system of scales. A new shaped set of clefs is adopted, by which a given note will retain the same relative position upon the staves for all instruments and clefs; and instead of using only five lines in a stave he employs a greater number, having one called a "union line," differing from the others in size or color to render it conspicuous, to enable a person to distinguish the position of the notes more readily. We are inclined to the opinion that this new method is an improvement.

Making Carmine—B. Wood, England, patentee. The following method of making carmine (the most beautiful red color) may be very useful to some of our artists, who have to pay a much higher price for this material than it would cost themselves to make it. Take 9 ounces of the carbonate of soda, and dissolve it in 27 quarts of rain water, to which are added 8 ounces of citric acid. When brought to the boiling point 1 1-2 lbs. of the best cochineal, ground fine, are added, and then boiled for 1 1-4 hours. The liquor is then strained or filtered and set by to cool.—The clear liquor is then boiled again, with 9 1-2 ounces of alum, for about ten minutes, and is again drawn off and allowed to cool and settle for two or three days. The super-natant liquor is then drawn off and the sediment which has fallen to the bottom is filtered and washed with clean cold soft water, and is finally dried by evaporating all the moisture The result is fine carmine, which can be made into the finest red ink by dissolving it in a caustic solution of ammonia, adding a little dissolved gum arabic.

By the old plan of making carmine, no citric acid was used; the cochineal was simply boiled in soft rain water for two hours containing a minute quantity of carbonate of soda, then allowed to settle, and treated by remainder of the process described above. An improvement in the brilliancy of the color is obtained by adding about one-ninth part of the crystals of tin to the alum, using for this purpose a ninth part less of alum than the amount given above.

Monument to James Watt.

The citizens of Greenock, in Scotland, the native place of James Watt, are erecting a monument to his memory, and invite contributions of materials from every country. A resident of Washington—a native of Geenock—has forwarded a beautiful block of Seneca marble, to be placed in the monument.

Notes on Ancient and Curious Inventions.—No. 2.

Connecticut—On March 10, 1663, the General Assembly of Connecticut passed an act for the encouragement of any person who would lay himself out for the discovery of any mines and minerals.

Slitting Mill.—In 1716 an act was passed granting to Ebenezer Fitch & Co., the exclusive right to erect a slitting mill at Stony Brook, to slit and draw out iron rods for nail makers, and all other persons in Connecticut were forbid to erect slitting mills for 15 years, upon the penalty of being fined ten pounds per month.

Iron.—Connecticut seems to have devoted anxious and early attention to the encouragement of iron mines and manufactures. In 1734 a patent to 100 acres of State land; at Salisbury, was granted to Philip Livingston, of Albany, N. Y., and others, they having found a bed of iron ore there, and having also set up works to manufacture iron from it Salisbury iron has a very high reputation at the present day. In 1736, pig iron, potash and common iron kettles were made at Salisbury. In 1775 £1450 were expended by the "Council of Safety," to prepare and work the furnace at Salisbury, for casting cannon and shot; 59 men were employed, and vigorous measures were adopted to furnish iron sinews for the Revolutionary war.

Iron Wire.—The supply of iron wire from England, being cut-off by the war, £300 was granted to Nathaniel Niles, of Norwich, by the Assembly, to erect works and make wire for cards and such like articles; he manufactured wire during all the War of Independence.

Steel.—In 1728, Samuel Higley, of Simsbury, and Joseph Dewey, of Hebron, made good steel of iron, and prayed for a patent for twenty years to prohibit all others from making steel. This was the first steel said to be manufactured in America, and a patent was granted for ten years.

Self-Winding Clock—On the 6th October, 1783, a patent was granted by the Assembly, for fourteen years, to Benj. Hanks, of Litchfield, for making a clock to wind itself up by the help of the air, and which was to continue to do so, without any assistance, until its parts were destroyed by friction; it was also to keep the most regular time of any machine ever invented. The late perpetual motion exhibited in this city, was far inferior to this old one in point of utility.

Drill Plow.—In 1765, the London Society of Arts awarded a gold medal to Benj. Gale, of Killingworth, for a new and improved drill plow. Benoni Hilliard, of Saybrook, petitioned the Assembly at Hartford to make Gale pay him £50. He asserted that he was the inventor of the drill plow, and having entrusted Gale to bring the subject before the London Society of Arts, he, instead of doing so, declared to the Society he was the inventor himself and not Hilliard. How the difficulty was settled, is unknown. It was a mean and contemptible act on the part of Gale.

Glass.—A patent was granted for twenty years, in 1747, to Thomas Darling, of Hartford, for the exclusive privilege of making glass. This act appears to have become void, because of the patentee not fulfilling its conditions; and at various times after this, special grants were made to others to introduce the manufacture of glass.

Paper.—In 1770, C. Leffingwell, of Norwich, had manufactured 4020 quires of writing paper and 10,600 quires of printing paper, and was paid a State bounty of £81, 16s. 8d.

Torpedo.—In 1776, David Bushnell, of Saybrook, invented a torpedo to blow up the ships of the British, and he was granted £60 to perfect his invention, which was said to be very ingenious.

Tide Mills.—In 1773 there was a great drought in Connecticut, and the streams for operating the old undershot wheels, for grinding grain, became so low that in four months only twenty bushels were ground at Saybrook, and persons residing there had to carry their grist to the tidal mills of Long Island; John Shipman, of Saybrook, then petitioned the Legislature for a patent for an improved tidal mill, and it was granted to him for forty years, for the town of Saybrook, and twenty miles west of the Connecticut river. All persons were forbid erecting and improving tide mills within those limits during that period.

Water Perpetual Motion.—At this period Harris Ransom, of Colchester—a prisoner in jail, petitioned for a patent of 100 years, for making water rise thirty feet high from any pond, or spring, to convey it to towns or cities. This was no doubt the common syphon which Ransom called "a perpetual water motion." This petition was not acted upon.

Stocking Looms.—In 1777, James Wallace, a stocking weaver, from some place abroad, petitioned the Assembly for the loan of £100 to construct stocking looms, and a machine to spin the materials. He declared he was master of his business, and could make silk, cotton, and worsted stockings as cheap as they could be made in the "old country." His petition was rejected. On the succeeding year, Benj. Hanks, of Windham, also petitioned the Assembly for a premium for making stockings on looms. In 1789, Thomas Hubbard and Christian Leffingwell, of Norwich, having erected eight stocking looms, prayed to be relieved of poll taxes—their apprentices being rated for such. This petition passed the Lower House, but was negatived in the Upper.

TO CORRESPONDENTS.

J. P., of Va.—We do not know of any concern in this country engaged in the sale of asphalted felt for covering building; we understand that it is used in London with excellent success.

A. D., of N. C.—The first patent of Young & Wilson's smut machine was issued in 1839, and therefore expired by limitation in 1853; it was not extended. Their second patent was issued in 1844, and will not expire until 1858. The time for its extension has not arrived, and we presume no action has been taken in regard to it, as such action would be premature.

D. L. I., of Mich.—We should be doing you a great injustice if we did not advise you that your alleged perpetual motion is an absurdity. If constructed after the plan shown in the drawing, it could not make a half revolution without the application of external force. You are pursuing a phantom, and we advise you to abandon the chase. We repeat what we have before said, viz., a perpetual motion is an impossibility.

T. S., of N. Y.—The Miller and Millwright s Assistant is published by H. C. Baird, Philadelphia. The millwrighting information in it is not extensive.

J. B., of N. Y.—Your plan of using the gravity of wate in a vertical line, with a tier of buckets on a deep endles belt is very old; it involves too much friction, and we would not advise you to build such a machine. We have given the rules for calculating the velocity of water from the standard authorities.

E. J. W., of N. Y.—A ball shot from what is called a smooth-bore rifle (a misnomer,) has not a rolling motion like a ball rolled along a plank. How could it get such a motion? We cannot tell how Sharp's rifle can send a ball to a greater distance than any other breech-loading rifle, nor do we believe it can.

A. F. O., of N. Y.—If you apply by letter to the Sec' of the Smithsonian Institute, he will send you a pamphlet on the preserving of insects, reptiles, etc.

F. D., of N. Y.—Circular saws made in sections, are no new. Each tooth was secured to a hub. Your method of fastening the teeth is different from any plan known to us and a patent may be obtained.

C. G., of Ohio—It is not an established fact that cold air injected into steam will cause it to occupy double the space at the same pressure—in other words, double its power. We are in possession of no data, establishing the fact of such expansion.

G. H., of Va.—If you get "Fairbairn on Cast and Wrought Iron," it will give you the information desired on cast-iron girders. It is published by J. Wylie & Co. this city.

J. A. & Sons, of Mass.—The only way to prevent the dry rot in hickory and oak, is to submit it to a current of dry hot air, as soon as it is cut, taking care to commence with a low heat, and increase it gradually up to 212 degrees.

P. B. J., of Texas—Forty cubic feet of water is required to be evaporated in ten hours in a four horse power boiler. One cubic foot per horse power is the rule.

R. W. H., of Ct.—Mechanical cradles are very plenty in this market: it has been our privilege to use one of Walker's best, and we can speak understandingly of its hush-my dear properties. You could get no patent for yours.

T. D. I., of Mich.—Double axles for railroad trucks are not new; this would doubtless "obviate the wringing and twisting produced in the making of a curve," but as yet we are not aware that they have ever been tried. No chance, however, to procure a patent. We are not aware that any machine has ever been invented for the purpose of holding lath to the wall for nailing.

A. A., of N. Y.—Sir Snow Harris' work on Electricity will give you the desired information; there is an illustrated article in the Encyclopedia of Chemistry on the subject. If you write with lunar caustic solution, then apply the alkaline solution afterwards, you will obtain indelible marks on linen.

W. H. S., of Vt.—Coke is produced by the distillation of bituminous coal, on the same principle that charcoal is produced from wood. In the process of coking nothing is thrown off but carburetted hydrogen gas, which is used for lighting purposes. The coke retains the carbon, which is valued for its heating properties.

A. E. S., of Phil.—Venetian soap is a term used by some persons for soluble glass; which is made of white sand dissolved in a strong caustic alkali.

J. G., of C. W.—The overshot is as good a wheel as you can put in on your fall, but the turbine is much cheaper; C. Vandewater, of Albany, N. Y., will agree to build you a good wheel. It will be best for you to get your anthracite coal from Buffalo or Rochester; you can get good quality from almost every coal dealer.

H. W. T., of La.—We cannot furnish you with the number of the Tribune containing the article on Climatology. The Smithsonian Institute has adopted means for recording Meteorological Observations in different parts of our country. We may be able to give you something on the subject soon.

L. S., of Pa.—We are not aware that there is any standing reward offering in England for the best life-boat; your impressions in regard to this matter arise, no doubt, from the fact that, in the year 1850, the Duke of Northumberland offered a reward of $500 for the best life-boat; 300 plans were submitted, and after a patient examination of all the documents relating to them, the Committee awarded the prize to Mr. Beeching, of Yarmouth, England. The boat cost about $1250, and is very generally employed, we believe, on the Government vessels; there are better life-boats in this country.

C. H J., of Boston—Your plan of giving receipts to passengers, on Railroads, would be very useful; but not patentable. We believe that all fares should be collected at the stations, which could easily be made so as to allow no person to enter a train without passing through the collector's office, the same as is done at steamboat ferries.

M. of Boston—Is it a positive fact, that Uria A. Boyden's wheels have yielded 90 per cent. of the water power?

L. H., of Mass.—Your article is well written, but it i not so pointed and conclusive as we would like, and as you appear to b e capable of making it.

J. E. R., of Md.—We do not know what has become of the perpetual motion. It has left this city, we believe.

B. H., of N. Y.—A regulator is not of so much importance on a small engine as a pressure gauge; we should certainly advise you to use a gauge.

G. F. T., of C. W.—The best time for transplanting cedars, spruce, etc., is in the early part of spring. Their future growth depends principally upon the method of transplanting. Make the hole in which their roots are placed a perfect m.. puddle, then fill in with good mold.

W. B. G., of N. Y.—We are not acquainted with any standard work on waves, but any good Encyclopedia contains such information as you want.

J. W., of C. W.—We refer you to any work on geometry for a solution of the circle and ellipse question; Blakie & Sons, 117 Fulton street, this city, are publishers of the best work on mechanical drawing. We cannot refer you to such a book as you want on Floral Botany.

T. M., of Vt.—You should first make one of the instruments sketched by you, to test its tone, and then you will be able to form an opinion of its utility.

G. W. F., of Del.—Salt brine excluded from the air will retain its strength. Dry salt will not injure gutta percha. The temperature of the atmosphere to freeze water in a hydrant, requires only to be a little below the freezing point, but it may be possible to pack a hydrant box so close with dry charcoal, that the water will be prevented freezing when the air is far below zero. Your plan is not patentable.

T. E., of Mass.—There is some difference of opinion among painters as to the relative advantages of the oxyd of zinc and the carbonate of lead; the zinc we consider as the most durable, under all circumstances, and the lead dries more rapidly, and has equal "body;" taking into account the deleterious properties of the lead, and entire freedom of zinc from everything like poisonous matter (provided the arsenic is carefully taken out of the ore,) we give our preference to zinc. Each substance, however, has its good and bad qualities, and it is a matter of taste as to which is the more preferable; for outside work we should use zinc white.

N. B. Gaylord, of Po'keepsie, N. Y., wishes to procure a machine for knitting stockings; will some of our readers oblige Mr. Gaylord with the information he desires

E. W. G., of C. W.—A pivot cannon is older than this generation; there is no chance whatever for you to secure a patent on it.

G. R. Prowse, of Philadelphia, wishes to correspond with some manufacturer of wire covers. He has usually imported them from France, but prefers to purchase American manufacture if they can be had.

G. W. Rowell, P. M., of Atlanta, Ill., is about to commence the manufacture of brooms, and wishes to pur chase the best machinery adapted to this business.

Money received at the SCIENTIFIC AMERICAN Office on account of Patent Office business for the week ending Saturday, April 5, 1856:—

M. & B., of S. C., $35; S. M. P., of N. Y., $15; T. W., of Pa., $25; C. R. B., of N. Y., $27; S. W. R., of Mass., $25; J. McC., of L. I., $30; C. J. C., of Pa., $25; W. J McC., of N. Y., $30; N. M., of N. Y., $60; W. N. T., of N. Y., $25; O. D., of Md., $45; J. W. S., of O., $35; J. V. J., of Mich., $30; W. H. B., of Ind., $55; H. C., of O., $30; J. S. S., of Ind., $55; C. S. C. C., of Mass., $30; C. F. B., of R. I., $30; J. A. R., of N. Y., $30; H. H., of Mass., $20; W. T., of O., $55; J. E. & E. J. P., of Conn., $25; J. A., of Tenn., $30; S. H., of Texas, $25; B. M. & D. W., of N. Y., $250; F. K., of N. Y., $30; K. D. & K., of Pa., $60; E. N., of Mass., $30; A. G. F, of Ill., $25; W. B. K., of Mass., $25; D. W. C., of Conn., $250; J. S. J., of Pa., $52; B. G., of Mass., $25; E. E., of Ill., 25; W. B. & Co., of R. I., $15; J. R., of Ill., $25; J. E., of Mich., $40; J. E., of Pa., $30; G. W. H., of N Y., $30; J. P., of N. J., $27; J. E. M., of N. Y., $30; G. & W., of Wis., $30; J. G. H., of N. J., $60; H. S. V., of Ind., $25; N. N., of Ill., $25; O. S., of N. Y., $10; J. A. S., of Tenn., $30; A. B., of Conn., $30; S. J. A., of N. Y., $30; J. F. A., of N. Y. $25; J. E. A., of N. J., $35; D. M. S., of N. Y., $12; E. K., of N. Y., $50; R. G. G., of N. Y., $25; S. F. F., of Vt., $25; A. C. K., of N. Y., $55; G. C., of N. Y., $55.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, April 5:—

C. B. B., of N. Y.; C. J. C., of Pa.; J. W., of N. Y.; S. M. P., of N. Y.; J. F. A., of N. Y.; S. W. R., of Mass.; J. E. A., of N. J.; W. S., of Pa.; J. E. & E. J. P., of Conn.; S. H., of Pa.; J. & H. O., of Ind.; H. H., of Mass.; A. B. W., of Conn.; W. N. T., of N. Y.; W. B. K., of Mass.; E. K., of N. Y.; B. G., of Mass.; A. G. F., of Ill.; R. G. G., of N. Y.; J. E., of Pa.; J. R., of Ill.; J. F., of N. J.; T. W., of Pa.; H. S. V., of Ind.; N. N., of Ill.; M. M., of N. Y., (2 cases); S. F. F., of Vt.; A. C. K., of N. Y.; W. A. A., of N. Y.; G. C., of N. Y.; J. P. C., of N. Y.

Science and Art.

Enameling Iron.

The articles to be enameled are first subjected to a full red heat for half an hour in an annealing furnace, and then allowed to cool slowly, after which their surfaces are scoured clean and bright, and freed from all grease, when they are ready for the first coat of enamel. This is composed of six parts, by weight, of flint glass, three of borax, one of red lead, and one of oxyd of tin. These are pounded together in a mortar, and then kept at a strong red heat in a reverberatory furnace for three or four hours, during which period they are frequently stirred, to effectually mix them, and expel all volatile matter. When partially vitrified the whole is withdrawn in a pasty state, dropped into cold water, and is then easily ground to powder, which is called "frit." With one part of frit is mixed two of calcined bone dust, which is ground in a mill until perfectly fine and soft, and of the consistence of thick cream, when it should be strained through a fine cloth. The article to be coated is now held over the vessel containing the semi-liquid, and a suitable quantity poured over it; some articles may be dipped in the enamel. When drained, and sufficiently dry as no longer to run they are placed in a japanner's stove, kept at a heat of 180°, until all moisture is expelled; defective places may be filled up with a brush. When perfectly dry they are placed in the vitrifying furnace at a glowing red heat, and when the coating is partially fused and it adheres firmly to the metal they are withdrawn and laid on a flat iron bench to cool. When cold they are wetted with a sponge, a second coating given, dried, and fired as before—a different composition being used. This consists of thirty-two parts, by weight, of calcined bone, 16 of China clay, and eight parts of potash dissolved in water, mixed, baked, and ground in powder. To five parts of this powder is added sixteen parts of flint glass, five and one-half of calcined bone, and three parts of ground calcined flint. In this second firing the articles must be kept in the furnace until the second coat is thoroughly incorporated with the first.

The articles having been twice coated are again treated with another composition, consisting of four parts, by weight, of felspar in powder, four of white sand, four of carbonate of potash, six of borax, one of oxyd of tin, one of nitre, and one of whiting; these are fritted, ground, and made into a creamy paste, as before described. In firing the articles for the third time they must be subject to such a heat as thoroughly to vitrify the glass, to spread over and become entirely incorporated with it, so as completely to glaze the surface. A fourth coat may be given, if thought desirable, to give a full and rich enamel covering. By these several processes, and by varying the materials of the compositions iron articles may be made to represent the best china, either pure white or ornamented in colors and gold, or merely covering with a pure transparent coating. In the first attempts to enamel iron arsenic formed an ingredient in the formation of the enamel, but was found highly injurious.

Guano.

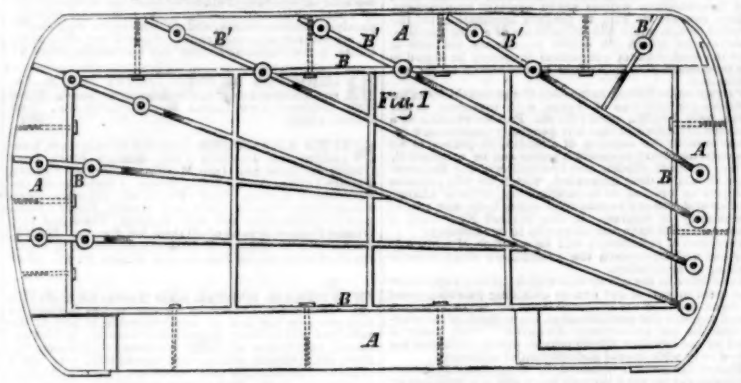
As our farmers are now intent on providing food for the crops of this season, and as vast quantities of guano are now used for this purpose, it behoves them to be very careful in purchasing it, because its price is high, and because it is not easy to judge of its quality by the sense of sight or smell.

The substances to be looked for in good guano are, 1st. Water, ammonia, ulmic, uric, and humic acids, which are volatile; also organic matter, separable at a low red heat. 2nd, Fixed alkaline salts, such as sulphate of soda, chloride of sodium (common salt,) and alkaline phosphates, separable by boiling water from the ash of No. 1. Third, earthy salts, consisting of the carbonates and phosphates of lime and magnesia, separable by hydrochloric acid from the residue of No. 2. 4th, and last, sand or silica—which is insoluble.

How to Analyze Guano—Take 100 grains of guano, and place it in a capsule and submit it to a low red heat, until all the black particles are burned away, and a white ash left; weigh this. That which has passed off should be about from 60 to 70 per cent. of volatile organic matter; the remainder left is No. 2, above. This is now digested in boiling water, which dissolves the alkaline salts. The clean liquor is then poured off, and all the water evaporated. The powder is then weighed. Good guano should contain about from 4 to 6 per cent. of these alkaline salts. That part remaining undissolved in the water, is No. 3, above. This is now taken and submitted to hot hydrochloric acid for about twelve hours, when it is filtered, washed, and weighed. The matter thus taken up and held in solution, consists of carbonate and phosphate of lime and magnesia, which is precipitated by ammonia as a gelatinous precipitate, which, on being dried, should amount to at least from 15 to 25 per cent. of the guano. The remainder of the matter undissolved by these processes, is sand, and in good guano should not exceed four per cent. Farmers should be careful not to pay for sand instead of guano. From 50 to 70 per cent. of good guano should dissolve in a hot solution of caustic potash, with a strong smell of ammonia.

IMPROVEMENT IN PIANOFORTES.

Fig. 1



Improvement in Pianofortes.

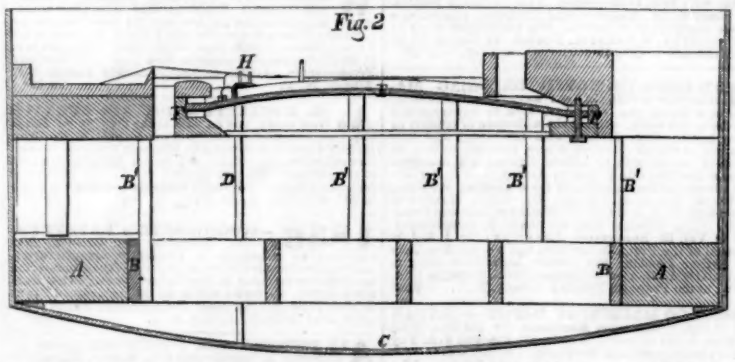
The accompanying engravings illustrate the recent improvements by Mr. Spencer B. Driggs, of this city, whereby the musical powers and tone of the piano is greatly improved, and the time required in the construction is much abbreviated.

Fig. 1 is a top sectional view, and fig. 2 a transverse enlarged section. The inventor dispenses altogether with the thick bottom planks of the case which consume so much time and labor in their production; he also does away with a large portion of the block work connected with the case, so that the case may be made quite thin. In lieu of the bottom planks, blocking, &c., he employs a strong frame of wood, A, on to which the open iron frame, B, is bolted; some of the ribs, B', of this frame run in the same direction as the strings, and extend over on to the wooden frame, A, where they are separately secured. The wrest plank is supported upon the outer ends, B', of the ribs, which at this point are made high for that purpose. The two frames, A and B, constitute the bed upon which nearly all the working parts of the instrument are supported; they are thus isolated, as it were, from the case. Advantage is taken of this isolation to introduce an extra sounding board, C, (fig. 2,) which covers the entire bottom of the instrument; this sounding board is connected with the upper sounding board, E, by means of the post, D; every vibration of the upper board, E, is thus transmitted to C, leaving the instrument encased in a huge sonorous shell, as sensitive to musical vibrations as the case of a violin. It is almost needless for us to add that these improvements greatly increase the sounding power and quality of the instrument.

The upper sounding board, it will be observed, is arched or convex, which form is given by making it a little larger than the iron pawl, F, in which it is held, and then pressing it into the frame. The arch form permits the use of much lighter and more sensitive material. In ordinary pianos the sounding board is flat, and is strengthened with extra ribs.

The inventor has provided an ingenious metallic saddle, H, through which the strings

Fig. 2



pass; resting upon the metal they are less liable to get out of tune, for the heavy strain of the strings pressing constantly upon wood, as in the present mode of manufacture, indent it quite sufficiently to throw them out of unison, while the metal surface offers more resistance, and is, consequently, less liable to wearing; the string is also enabled to receive a stronger blow, the vibrations still being direct and without any disturbing influence. Among other advantages gained by the present method of construction are compactness, and unyielding strength of the iron frame, which, bearing the whole strain of the strings without any assistance from the wood, can neither shrink nor warp, so that when the strings have once settled to their proper tension the instrument will, we are informed, remain in tune at the proper pitch for many months. In the ordinary piano the real strength depends, to a great extent, upon the thorough seasoning of the wood; and how many are made of mere green and worthless stuff need "ot be mentioned here. Mr. Driggs ignores all strength derived from that source, relying solely upon the compact and unyielding iron frame, which will neither spring nor give.

The thin upper sounding-board is rendered stiff and convex by means of its iron frame; the thin lower sounding-board or bottom is rendered concave and stiff by being pressed into the scantling frame. The sounding-post passing from the lower to the upper sounding board, thus connecting the vibrations, and the thin, shell like case surrounding and combin ing all, present a new combination of vibratory agents never before used in the manufacture of pianoforte. Like the violin, this piano is entirely free from incumbrance inside. There is not a single block of wood—except the rest-plank for turning pins—nothing, in short to absorb or muffle the vibration or detract from the power and purity of the tone evolved from the strings.

These results, it is said, are made appreciable to the hearer by a purity and richness of tone, which is vocal and sympathetic in the highest degree, and an increase of power, which is not merely additional noise caused by a violent concussion of the hammer, but an additional greatness of sound, the tone being preserved at the same time in all its purity, brilliance, richness, and depth.

Instruments exhibiting these improvements may be seen at No. 505 Broadway, N. Y., where further information can be obtained.

Government Ships and Fire Arms.

Horace Greely in the New York *Tribune* says:—"The Federal Government—so far as I can now recollect—prosecutes but two branches of manufacture—the building of ships and the making of fire arms. In my judgment these are two national mistakes. If we had never built a national vessel in a navy yard nor made a musket at a public armory, but simply gone into the open market whenever we needed either, and bought our ships, or hired them built by the best ship-builders just as any great shipping house does in a like contingency, and so issued proposals for one hundred thousand muskets, rifles, or revolvers, as the case may be, leaving each bidder at liberty in his bid to vary the model in such manner as to secure increased efficiency or value in any respect, we should not only have obtained our ships and our arms much cheaper but have advanced the arts both of ship-building and gun-making."

We quite agree with our neighbor in the above remarks. It would be a national benefit if all our navy yards were at once abolished and their contents sold off at auction. Government could then take its choice of vessels and materials, accepting none but the very best.

A Cold March.

During the past month the highest temperature in this city was 47°—much lower than it has been for fifteen years. There has been only two showers of rain since the 26th of December, 1855.

We are indebted to Hon. Erastus Brooks for a printed copy of his excellent speech on an Agricultural College for the State of New York, delivered in the Senate Feb. 12, 1856.